JUN 9 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JUNE 9, 1898. CHICAGO, ILL. NUMBER

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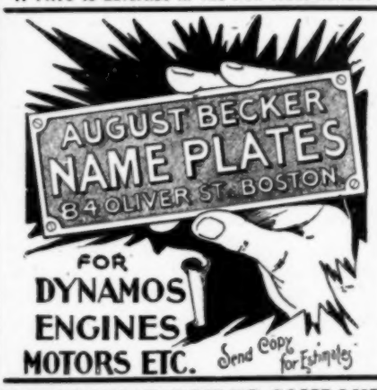

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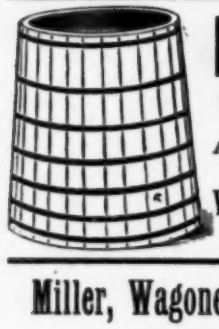

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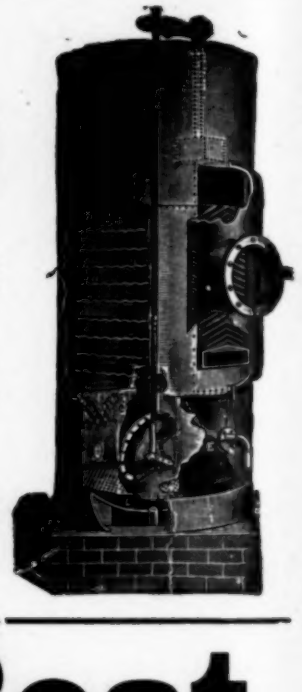

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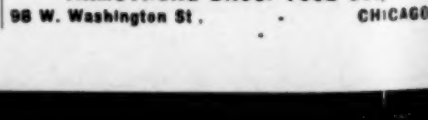

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. JUNE 9, 1898. CHICAGO, ILL. NUMBER 23

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Developments of the week in iron and steel have been in the main favorable. Cheap money, and the continued refusal of the trade to be checked or hampered by the war have facilitated negotiations for long deliveries. Perhaps the feature of the past fortnight's business is the long time covered by the contracts made, sellers giving way to an extent that did n ot seem probable one month ago. The Southern furnaces' agreement has practically fallen through, one prominent producer being dissatisfied with the tonnage coming to it under the arrangement. Buying has been so free of late that no jar in prices has resulted from the move. It is taken to indicate, however, that the non-Bessemer pig iron producers' association movement will not be the success that was promised a few weeks ago. There is just enough excess product, in spite of tremendous consumption, to keep buyers in an easy attitude, now that the export movement is so shortened. Meantime the complaint of furnaces because of low prices is accented. In the Central West and the Chicago district, Southern furnaces secured most of the business of the past week. Sales of basic iron are more of a feature in Eastern and Central territory. An Eastern Pennsylvania sale of 20,000 tons was made on a basis below $10, Philadelphia. In the Pittsburg district sales have been made at a shade below $9.50. Buyers of Bessemer pig iron are still making offers below the furnacemen's price and are still able to pick up iron at 15 to 20 cents under $10 valley. Ordinarily large third quarter purchases would be closed at this time but the test of endurance is likely to be still prolonged. Coke requirements have been covered by a number of furnaces up to Jan. 1, at $1.50 for standard Connellsville, though deals for the product of the smaller producers are reported at a trifle below this. The summer shut-downs for wage settlements are but three weeks ahead, and meantime mills are running full. While no serious disagreements over wages are anticipated, the curtailment of production may be sufficient in some lines to make prices for prompt deliveries firmer. Apart from this there is no influence in sight likely to cause any upward movement. Further agricultural contracts for steel bars have been placed, and aside from a 25,000-ton contract the large buying in this line is about disposed of. Prices were at bottom. A pipe line order, sharply competed for by 17 firms, went to an Ohio mill. Chicago reports another export inquiry for plates, this time for 10,000 tons. The Coolgardie contract for riveted pipe—46,000 tons—is up again and the opening of bids in August is expected to bring some of the business to the United States. A considerable tonnage of wrought pipe is also involved.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
808 TRADESMEN'S BUILDING, June 8.

Furnaces and steel works willing to sell for the last half of the year have had a large inquiry during the week—billets, gray forge, Bessemer and basic pig. The sales of iron have been largely in chilled basic and in finished material. Plates and bars are still the active lines. Of the latter another lot of 25,000 tons is pending.

PIG IRON.—There has been considerable buying of iron for ten days past—of which a large part was of basic iron. Bessemer for the third quarter has been in demand also and small lots have been taken at $9.75 and $9.85, valley, although $10 is still the furnacemen's quotation. The basic iron has gone principally to two or three large interests and was bought at about $9.50, delivered in Pittsburg. Bessemer for prompt deliveries has not moved perceptibly. A good inquiry has sprung up for gray forge and the valleys are asking as high as $9.90 and $10. While in Pittsburg it is firm at $9.25. The Oil Well Supply Co. are preparing to resume operations and will again be a user of forge. Edith Furnace of the Oliver & Snyder Steel Co. goes out of blast this week and will be made a dust catcher of the new Edith stack now in course of erection. There is an improvement in foundry irons and no more sales below $10 are reported. The furnaces ask $10.25. Quotations in Pittsburg are as follows:

Bessemer, valley	$ 9.75 to	$ 9.85
Bessemer, Pittsburg	10.40 to	10.50
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	10.00 to	10.25
No. 3 Foundry	9.50 to	9.75
Gray Forge, valley	8.75 to	8.90
Gray Forge, Pittsburg		9.15

STEEL.—There is considerable demand for billets for the second half of the year, but little disposition to sell ahead is shown the mills. Billets for prompt deliveries are still weak—$14.75 maker's mill—and specifications are slow in coming in. Sheet bars continue strong and are not easy to get as wanted. Mills quote $17, maker's mill, on sheet bars and $20 to $20.50 on rods.

SHEETS.—The sheet mills, from necessity, are running in a hand to mouth fashion. Specifications and new orders are alike scarce, excepting deliveries in the last six months of the year. This business the mills are refusing. Corrugating and roofing interests have done little or no buying as yet.

Black sheets are selling on a basis of 1.90c to 1.95c, for No. 28, and galvanized sheets at 80 and 7½ per cent off list.

PLATES.—Details have just been received for the first time of the large riveted water pipe contract for the Coolgardie, West Australia, gold-fields, that is now a certainty. It is announced that bids will not be opened until August. The work first came up last year and the tonnage of riveted pipe is given roundly at 65,000. In connection with the riveted pipe a large tonnage of lap weld pipe will also be used. Plate buying, from all sources, is very heavy and mills report no difficulty in getting 1.10c for tank. Mills quote shell 1.15c to 1.20c; flange 1.20c to 1.25c; fire box 2c and upwards.

STRUCTURAL MATERIAL.—The buying of shapes is light and the problem of keeping the mills busy is now causing more anxiety than for some weeks past. Large work is effectually blocked by the war and not much of it is expected until hostilities cease. The price war on angles by mills not in the pool has abated somewhat. Pool prices follow: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; tees, 1.20c, zees, 1.15c, and angles, 1.05c. Both local mills are getting orders enough for steady operation.

FERRO-MANGANESE.—The local producer quotes domestic ferro-manganese at $50 delivered at buyer's mill.

BARS.—The last of the three large Western agricultural buyers to contract for the season closed last week with a local mill. The bulk of this class of buying is now placed, although one inquiry for 25,000 tons is still open. The buying has been well scattered and, although the tonnage has not been wanted by all the mills, nearly all have booked more or

less of it, and some of the weaker interests have eagerly filled up. Prompt business in steel bars is good at 92½c to .95c. Common bar iron is quoted at .95c and branded all muck bar at 1.25c and upwards.

PIPES AND TUBES.—The pipe manufacturers made no advance in prices at their meeting in Pittsburg last Wednesday, June 1, but reaffirmed the second discount of 6 tens and 2½ per cent on small lots, and 6 tens and 5 per cent on car load lots. The 30 miles of line pipe bought ten days ago included the only large orders of the kind likely to be placed soon and there were 17 bidders. An Ohio mill took the work. With most of the mills the merchant pipe demand is good. Base discounts are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off.

SPIEGEL.—Spiegel is quoted at $23.50 and $24.

IRON AND STEEL SKELP.—We quote: Grooved iron skelp, 1.05c to 1.07½c; sheared iron skelp, 1.12½c to 1.15c; grooved steel skelp, 97½c to 1c; sheared steel skelp, 1.05c to 1.07½c. Skelp continues very weak and some prices are reported lower than the quotations given.

SPELTER.—We quote prime Western at $4 30 and $4.32½.

OLD MATERIAL.—One thousand tons of iron rails at $13.50 and 2,000 tons of steel rails at $10.25 are the only large sales of the week. We quote: Wrought scrap at $10.50, net, valley; heavy melting stock, $10.50, gross; cast borings, $6, gross; wrought turnings, $7.50, gross; car wheels, $10.50, gross. No. 1 wrought, $11.50, net; charcoal, scrap, $10, gross; heavy melting stock, steel, $10.50, gross; billet and bloom ends, run of mill, $11; busheling scrap, $9.50, net; machine scrap, $9, gross; cast scrap, $9.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1522 MONADNOCK BLOCK, June 8.

The week has been quiet, with steady sales of most lines of iron and steel, and every prospect of a continuance of good business. There has been practically no change in prices, although some grades of steel are hardly as strong as they were a week ago. The most important news is the report of the dissolution of the Southern pig iron association, caused by the withdrawal of one of the leading members. This is due, it is said, to the dissatisfaction of the withdrawing member with the share of the tonnage of sales that has come to it. The action has resulted in no change in prices as yet.

PIG IRON.—Sales of local irons have not been large, and the furnaces here do not expect to be able to take much business for some time, because of the heavy orders already on their books for delivery in the balance of the year. Southern furnaces have done a business aggregating over 7,000 tons. The largest sale was one of a little over 2,000 tons, and sales of 1,800, 1,500 and 1,000 were made, in addition to several of smaller size. The inquiries are somewhat smaller now, and not so much business is expected to be closed in the next few weeks. A number of the medium sized buyers have yet to fill their requirements, and this business will make the demand steady for some time ahead. It has transpired that sales were made two weeks ago of a considerable tonnage of Buffalo iron to this market, to one of the larger implement makers, shipment to be made by lake. This iron is now being delivered. The price is not available, but it is understood the sale was made on a basis considerably under prices asked by the local furnaces, the principal competition coming from Southern furnaces, whose prices had to be met. The largest sale of this iron was 12,000 tons to one customer but other orders increased the tonnage considerably. Talk is still heard of an advance in the prices of Southern iron, but now that the combinaton has been dissolved, it is not so likely to occur, for obvious reasons. Quotations are unchanged as follows:

Lake Sup. Charcoal	$11 50@13 00	South'n Coke No. 1	$10 10@10 35
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 35@10 60
Local Coke Fdy. No. 3	10 75@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	14 00@16 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	11 50@12 00
South'n Coke No. 2	10 35@10 60	Coke Bessemer	11 50@12 00

BARS.—Season's contracts from the agricultural implement, wagon and plow makers constituted the bulk of the business closed last week. The largest order of this class closed was from a Racine concern, which will take about 3,500 tons during the life of the contract. General business was good, and several quite large sales were made. Prices are unchanged, but the season's contracts—the large ones, at least—are being taken at figures considerably under those we quote. Small lot business, however, is going at about the prices given below. Quotations are unchanged: Common iron is quoted at 1.05c to 1.10c; guaranteed, 1.10c to 1.15c; soft steel bars, 1 15c to 1.20c.

RAILS AND TRACK SUPPLIES.—There have been a few small sales of rails—none over 500 tons—but the demand is light, and not much business is expected to develop soon. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—Business has been light, and no large sales were made last week. Prices are unchanged at $16 to $16.50 for billets and $22.25 to $22.75 for rods

CAR ORDERS.—The Northern Pacific is in the market for a round lot of cars, and one or two smaller orders are expected to be placed soon. Last week only two small orders were given out. Car material sold in comparatively small quantities.

STRUCTURAL MATERIAL.—Considerable business was let last week. The Garrett building contract, taking about 2,500 tons of steel and castings; the Strong building, 1,000 tons of steel; the Fraser & Chalmers machine shop, 1,500 tons; the South Bend hotel, 700 tons, and track elevation for the C., B. & Q. to the extent of 2,000 tons, were all let in the week. Considerable business reported recently as under negotiation is still to be placed, and the outlook is for an excellent market here for some weeks. General business has been good, and sales in small lots last week were quite large. Quotations are as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at ¼ to ½ cent higher.

PLATES.—An inquiry for 10,000 tons of plates, for foreign shipment, is in the market, and is expected to be placed soon. The local mills are full of work on old orders, and are not anxious for much more business. Sales last week aggregated a good tonnage, both from mill and from store, and the demand for small lots is good. Prices are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

SHEETS.—Considerable business has been done in black sheets, which are in active demand. Several large season's contracts have bean placed. The market is a little lower at 1.90c to 2.05c for No. 27 black. Galvanized sheets are quieter, but sales last week made a good aggregate. They are quoted at 80 and 10 and 2½ per cent discount.

MERCHANT STEEL.—A large tonnage was placed last week by the implement makers, who are contracting for their season's supplies. Further business of this character will be given out this week. The demand is excellent, and sales to this class of consumer are larger than in any previous season. Prices follow: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7.50c; specials 11c and upwards.

SCRAP.—There is very little demand for any class of scrap, except from Eastern mills for rolling mill material. Very few sales have been made to the East, however, and these were not large. Dealers' selling prices are as follows:

Old iron rails, gross	$12 25@$12 50	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@11 00	Cast borings, net	4 25@4 50
Old steel rails, short	8 75@9 00	Wrought turnings, net	6 00@6 50
Old wheels, gross	11 00@11 50	Axle turnings, net	7 00@7 25
Railroad forge, net	11 50@12 00	Mixed steel, gross	7 25@7 50
Dealer's forge, net	10 00@10 50	Stove plates, net	5 75@6 00
No. 1 mill, net	7 50@8 00	Heavy melting steel, gr.	8 25@8 50
Heavy cast, net	8 50@9 00	Old iron splice b., net.	12 75@13 00
Malleable cast, net	8 00@8 50		

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., June 8.

Present interest centers in figuring on what may be accomplished before the close of the season. Two factors may reduce the actual total mined below the estimate of the early spring. For old range Bessemer properties that estimate was 6,000,000 tons. It now seems that shipments from these mines will fall

half a million below the estimate. The inadequacy of labor supply is one reason, and another is the unwillingness of certain owners of smaller properties to operate at all under existing conditions. If 12,000,000 tons, for all sorts of Lake Superior ores, be granted as a safe estimate of sales and of producer consumers' schedules, a million or two may doubtless be added to represent the statistical round-up next winter. Such is the limitation on the possible output of the most desirable ores that sales of non-Bessemers at $1.90 as against $1.80 early in the season are reported. Information concerning the prices made in Mesabi transactions thus far varies somewhat. In general 5 to 10 cents above last season's basis has been realized. The feature in transportation is an absence of cargoes to occupy the wild tonnage open to engagement for this part of the season. Provision had been made by shippers for the moving by contract of nearly everything now in sight. Wild rates are 50 cents from Lake Superior, and 40 cents from Escanaba

PIG IRON.—Buyers of Bessemer iron are still avoiding the associated furnaces of the valleys in transactions actually closed, but that a resort to furnaces direct will shortly become a necessity is the firm belief of those party to the agreement. Direct inquiry fails to show what has been accomplished thus far toward covering large Cleveland district requirements for the third quarter. While for some days there has been a hunt for iron at a stated price below $10.65 delivered, the report that 30,000 tons has been bought for Northern Ohio use cannot be confirmed. A contract for 10,000 tons of basic iron recently closed, will occupy the capacity of one valley furnace in June and July, involved a premium for sandless pig. Specifications and new contracts for foundry iron are somewhat better than has been the case for about a month previously. Furnace coke requirements up to January have been covered at $1.50. The prospective idleness of valley furnaces has had its effect on the coke market. We quote f. o. b. Cleveland:

Bessemer, second quarter	$10 65	Valley Scotch No. 1	$10 65@10 75
No. 1 Strong Foundry	10 65	Valley Scotch No. 2	10 25@10 45
No. 2 Strong Foundry	10 15@10 40	Gray Forge	9 20
No. 3 Foundry	9 65	Lake Superior Charcoal	11 55

FINISHED MATERIAL.—Local iron mill capacity is now occupied almost to its limit in consequence of the proximity of mid-summer, and a tone of firmness is given to the attitude of mills thus situated. Sheet mills are faring better for orders naturally to be expected at this time of year than was the case some weeks ago. Much of the capacity is decidedly busy, but at the same time other concerns are actively looking for more employment. Local steel plants are receiving abundant specifications, and are rushed, as has been the case all spring. Structural material is quiet. Prices are maintained at pool figures. Angles are quoted 1.05c, Pittsburg, by pool mills, but have been sold at that price delivered in Cleveland. Angles smaller than three-inch leg are not included in the pool arrangement. Some local buying of steel bars is reported, at unchanged prices. Cleveland deliveries have been quoted 97½c in large lots.

OLD MATERIAL.—Much of the buying of old material is for steel works use. We quote old steel rails at $10. Some old iron rails have been taken at $13.75. Busheling scrap is $9, borings and turnings $6 and $7, and No. 1 railroad wrought scrap, $11.50, valley basis.

CINCINNATI.

June 8.

The past week has been quite an exciting one in the Central district. There have been deals under negotiation amounting to 50,000 or 60,000 tons of Southern iron and the sellers have naturally been very active in their efforts to secure the contracts. The lines of trade principally concerned were stove works, cast iron pipe foundries and rolling mills. A considerable part of the business has been placed, but some of the buyers are waiting to see whether concessions are obtainable. The striking feature of demand is that in several instances unusually long delivery has been required. The sellers have preferred to make December the limit, but buyers have forced them into conceding several months in 1899. It is expected that within the next 10 days most of those who are now testing the market will have bought, but there are many others yet to cover their wants for the last half of this year. There is considerable difficulty in getting shipments forward as rapidly as buyers require. Many of the furnaces have only a limited supply of several grades in stock and requests to rush shipments are frequent, while those to hold back are seldom received. There has been no change in the price of Lake Superior charcoal and coke irons. The demand continues good and prices are based largely on the quality of the iron and condition of the furnace's order book. We quote for cash f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.75; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75; mottled, $8.75; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to $11.50; Belfont coke, No. 2, Lake Superior, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

BUFFALO.

June 7.

A fair volume of business is in progress with a tendency on the part of some sellers to stiffen prices to match the improved demand, which, however, is vigorously resisted by buyers. Consumers are calling for deliveries on contracts at an increasing rate, so that aside from prices, which are exceedingly low, the general business situation in pig iron is satisfactory. There is considerable movement in Lake Superior charcoal and special coke brands for malleable use. Malleable iron works and agricultural implement manufacturers seem to be the most actively engaged of pig iron consumers. We quote for cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $11 to $11.25; No. 2, $10.50 to $10.75; Ohio strong softener No. 1, $11.50 to $11.75; No. 2, $11 to $11.25; Jackson Co. silvery No. 1, $14; Southern soft, No. 1, $11.50 to $11.75; No. 2, $11.15 to $11.35; Lake Superior charcoal, $11.50.

Prosperity Seen in the Boiler Trade.

Joseph T. Ryerson & Son, of Chicago, say in the *Boiler Maker:* "Since the records of this house have been kept, prices and demand have always been at their minimum in May or June, with but one exception, the panic of 1893. Following this low ebb of the spring season, our books show an increasing demand and frequently higher prices until the snow began to fall. It is safe to say the manufacturers of steel have order books as full as they dare keep them, and is it improbable that with lessened output due to summer's heat, shut-downs for repairs, and higher wages, that an advance can be delayed? All products of the farm, mine and forest, save steel alone, are higher by from 20 to 100 per cent than was ruling in 1896—and yet steel is at its lowest level. During the last two weeks it has been common for shops to refuse further orders for delivery within less than 60 days. Therefore with high prices for all farm products being assured for the balance of this year, with prospects of a magnificent crop now assured, with the balance of trade in our favor of $2,000,000 per day, our claim for 'good times in 1898' are about to be fulfilled."

THE Burgess Steel & Iron Works, the largest iron mill between Wheeling and Cincinnati, on the Ohio River, is a total wreck, having been completely destroyed by fire Tuesday. The fire started in the blooming mill and almost instantly spread to both the rolling mill and the steel plant. It occurred just as the day crew was being relieved by the night crew, or fatalities would have occurred. In a half hour the entire plant was in flames, but before 9:00 o'clock the fire was under control. The plant is a complete wreck, only a few of the large stacks are standing. Over 800 men were employed and are now made idle. The plant has the record of being the only iron institution in the west that has not lost a day in eight years. The loss, roughly estimated, is $400,000, with $200,000 insurance. Levi D. York, the leading capitalist, of Portsmouth, is president of the company and announces that the plant will be immediately rebuilt. Improvements valued at $100,000, including a basic steel furnace, had just been completed. The fire spread to several cottages in the vicinity and five were burned. They belonged to the company owning the plant.

THE Aurora Iron Mining Co. has just paid a dividend of 50 cents a share.

THE IRON TRADE REVIEW

AND

INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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ROD MILL DEVELOPMENT.

From its beginning in 1882, when the first wire rod mill was built in Cleveland, to stem the tide of importation, the growth of the wire rod industry in the United States has been a conspicuous feature of our development in iron and steel. For a time the wire mills of Cleveland were the single exception to the general use of imported rods by our manufacturers of wire and wire nails, the importations reaching in one year nearly 200,000 tons. But the Cleveland idea has gained ground steadily, with the result that of the 970,736 tons of rods rolled in the United States in 1897, nearly 80 per cent were produced on mills of the Garrett type. To-day American wire rods and their products go to every quarter of the globe. Continental manufacturers have been not a little exercised over this development. Not only have their far Eastern markets been invaded by American rods, wire and wire nails, but the same products have been laid down at their very doors. It is an interesting coincidence that the same man who was mainly instrumental in stemming the tide of foreign wire rod importation to the United States 16 years ago should have been occupied abroad within the past six months in equipping foreign manufacturers with American machinery that is expected to aid them in standing against the counter-movement of the past two years. The erection of an improved Garrett rod mill at Havre, France's northern seaport, is destined to cut something of a figure in French competition with American wire products in neutral markets.

Germany, also, is making an effort to regain outside markets which have been invaded by the products of American plants turning out 600 tons of rods in 24 hours, from a twin mill. One of the largest manufacturers of wire and wire rods in Germany is about to duplicate the twin rod mill at Joliet, Ill. The only difference in practice will be that instead of beginning with a 4-inch billet, one with a 5-inch cross-section will be used. Other Continental manufacturers, moreover, are showing interest in the same direction; and in the same way in which American machine tools are being bought to the help of European engineering establishments, the most improved methods and appliances of iron and steel manufacture in the United States are being sought after to aid in solving the problems forced by the enlargement of our iron and steel exports.

The question comes up, whether European manufacturers, after adopting the latest economizing methods and equipment of the American type, will be able, with their cheap labor, to turn back the flow of American products into foreign markets. That our foreign competitors should be able again to send their products this way is a possibility scarcely to be entertained, as long as cheap ore and fuel are in such abundance and our rail and water freights continue on the exceptionally low basis of to-day. The interesting fact in connection with the borrowing of American equipment in wire rod and other departments of iron and steel manufacture, is the admission that goes with it of the pre-eminence of American methods. Most significant, too, is the answer it gives to the assaults upon the protective policy, on the ground that it cultivates weakness and dependence in native industries.

STOVE MANUFACTURERS ON PRICES.

A committee of the National Association of Stove Manufacturers has under consideration the proposition to advance the price of stoves. Meantime the *American Artisan* has sounded the trade on prices, etc., as compared with 1895. Of 43 manufacturers answering, 38 favored an advance, 24 of them indicating the size of the increase desired. Half of these favored 10 per cent, others 5 to 10 per cent and eight a higher percentage than 10. Two-thirds of those who reply say that there has been a fall in the price of stoves since 1895, nine putting the drop at less than 10 per cent and 11 saying that it has been more than 10 per cent. All agree that there has been a marked shrinkage in the profits of the business. If the president's address at the recent Philadelphia convention reflected the general experience, stove manufacturers have fallen upon bitter conditions, between the buffetings of competition from those who do not know their costs, and the increasing pressure from the strongest and fittest who have found economies unknown to the followers of old-time methods. While there has been a substantial decline in the price of iron since 1895, with its boom, there has been an increase in the cost of stove ornamentation, and "general manufacturing expense" is higher proportionately, if not in some cases actually. It has come to the point where the profits of the business are confined chiefly to the savings over common methods, secured through the studied economies of the leaders in the race.

But after all the complaints that come up from the stove trade because the profits of other days, admittedly good, have gone, to return no more, it is doubtful if manufacturers in this line have been so

badly harrassed by competition in the past few years as have jobbing manufacturers, or car wheel founders. One thing that has helped to steady the stove trade is the uniform wage preserved through the protective association that has operated so successfully in this industry. When a manufacturer is assured that a strong competitor who might be tempted to slaughter a surplus in the former's territory must pay exactly as high a price for labor as his own, he has a strong guarantee that the incursion will not be serious. He knows exactly the size of the item that is usually counted upon to stand the brunt of unfair competition. The jobbing founder, with no certainty that his troublesome competitor is paying within 10 or 15 per cent of his labor cost, is threatened with losing prices on the one hand and on the other by the losses of a strike if he attempts to equalize labor schedules.

The testimony of the stove manufacturers, a large share of whom are in the movement to hold up wage schedules, would indicate that the defense association movement is not a panacea for all the ills of a sharply competitive regime. Nor is it offered as such. Yet we are inclined to believe that the condition of the trade would have been far less bearable to-day had the depression following 1892 brought the same reductions in wages of stove plate molders that were seen in other industries.

THE PASSING OF THE PROPRIETOR.

The editor has been calling for expressions of opinion regarding the advisability of men of brains fitting themselves for positions other than those involved in proprietorship. I think the matter is regulating itself, as all other matters will, sooner or later, if only left alone. In the progress of the times, or industrial evolution if you like, the day is already at hand when the managers of large enterprises are receiving more in salaries than they could make as proprietors of small or moderate businesses.

These large salaried managers often (and perhaps preferably) do not own a dollar's worth of stock in the corporations they manage. Further than this, they would ruin any small or medium business, for the reason that the things that a small concern cannot afford to do are the very things that the large corporation cannot afford not to do. The manager of the large corporation "thinks in millions;" the man who successfully conducts a small or medium business as proprietor is often like the man who could see the needle sticking in the barn door, but couldn't see a barn anywhere. He would ruin the large corporation as surely as the successful manager of the large corporation would ruin the small business.

It does not require much of an imagination to see that some time in the future there will be no manager-proprietors. And if so, it will then be impossible for any one, under any circumstances, to "rise" to the "position of proprietor." But I am getting on dangerous ground and would better stop. Anyhow, I don't think the editor need worry about the matter. It will regulate itself in spite of all the editorials that he (or he and I) could write in a hundred lifetimes. SCRUTATOR.

IRON TRADE COMBINATION RUMORS.

There have been persistent reports recently concerning efforts toward a combination of important steel interests. Chicago has had one active propaganda, and New York has been even a more active center of "news" that has about the same quality of reliability that belongs to many of the war dispatches. From Chicago the dispatch is sent out that Samuel H. Waddell, of Pittsburg, whose office is in the Carnegie Bldg., has bought for others 300 acres of land at East Chicago, on which a large steel plant will be erected. The name of H. C. Frick is mentioned in this connection. The story has been denied by those in interest and there seems no better foundation for it thus far than the desire of Chicago land speculators to boom their enterprise.

The New York reports have related to reputed efforts to bring together certain steel companies. The election of Robert Bacon, of the firm of J. P. Morgan & Co., as director of the Illinois Steel Co. and advances in quotations on the company's stock, are the principal basis of the stories. It is reported that J. P. Morgan & Co. are seeking control of the Cambria Iron Co., and later a combination of the Chicago and Johnstown companies. The Minnesota Iron Co. and the Rockefeller interests on the Mesabi are mentioned, also, as factors in the scheme.

The advance in Illinois Steel Co. stock can be explained by the improvement in the company's condition in the past year and the large volume of business it has been doing of late. Purchases of the stock have been credited to Mr. Rockefeller and to these the rise is attributed by the writers of the New York dispatches. The highest price touched by Illinois Steel in the past ten days was 59⅞. In January, 55¾ was obtained. On April 25, when stocks were at their lowest on account of the war situation, it touched 44½. The sales of the stock in the last week of May were 6,721 shares as against less than 1,000 shares a week for several weeks. Minnesota Iron was 57 on Jan. 20. Last week 74¾ was paid. At the annual meeting of the company on Monday of this week, a very gratifying report was made concerning the prospects of the company and the quarterly dividend of one and a half per cent was declared. Cambria Iron Co. stock has been strong and steady lately at 45 and 46.

There is little ground for the rumors of combination. It is highly improbable that the two Pennsylvania steel companies, in addition to those referred to above, would be included in any such arrangement. The Cambria-Illinois steel story has been afloat before. The most likely feature of the whole scheme is some closer working arrangement between the Mesabi giants and leading consumers of their ores. But little plausibility attaches to any of the newspaper projects in the shape in which they have been exploited thus far.

Personal.

Philip D. Armour has presented the Armour Institute of Technology, Chicago, with an additional $500,000 to maintain the school on the largely increased scale to which its operations have come of late. There are now 1,100 students in attendance, a considerably larger number than was planned for originally.

The directors of the Pottstown Iron Co., Pottstown, Pa., have elected William H. Heister, treasurer, vice Charles H. Ashburner, who resigned on removing to Baltimore. Mr. Heister entered the office of the company in 1888 as cashier.

S. R. Fellows, has tendered his resignation as manager of the Hubbard Furnaces, of the Andrews & Hitchcock Iron Co. Mr. Fellows has had charge of these furnaces for a little more than 11 years.

THE *Wall Street Journal* comments: "Brokers have no reason to complain over the volume of business compared with a year ago, when the bull market had begun to develop. Transactions last week in stock increased over a year ago a little over 100 per cent and sales of state and railroad bonds also increased a little over 100 per cent. Sales of stock exceeded 300,000 shares daily and daily sales of railroad bonds were in excess of $2,140,000." The Philadelphia *Press* editorially says, June 3: "The stock market rose yesterday to the highest point of the current year and bids fair before long to rise above the highest average of last year. The war has done nothing to reduce values and prosperous business conditions are fast advancing quotations and prices."

A POINT IN FOUNDRY MIXTURES.

TO THE EDITOR:

In your issue of May 19, a New York State foundryman cites another instance of the anomalous conditions confronting us daily in the foundry business. He states that he has two grades of iron of the same brand, one a No. 2 and the other a No. 3. They differ in total carbon by only .20, and in graphite .15 per cent. If we grant that the chemical analysis of each is correct, we have here an excellent argument for discarding grading by fracture. With 3.50 per cent total carbon, a variation of 20 points is not a serious matter, and as the other constituents, graphite excepted, are practically identical, there can be but one plausible explanation for the variation in fracture observed. The metal graded as No. 3 was evidently cast hotter, and therefore showed a greater chilling effect than did the No. 2. Both irons could have been interchanged readily in the mixtures without detriment to the work produced. The question is next asked: "What effect does the high combined carbon have on the high silicon?" This should be reversed and modified as follows: "What effect does high silicon have on the carbons in iron in general?" The answer would be, for equal casting temperatures the higher the silicon the lower the combined carbon (within limits), and the higher the casting temperature the higher the combined carbon.

The last statement that "the claim of strength rests on a combination of low silicon and low combined carbon," while appearing contradictory, as low combined carbon means soft iron, has some truth in it. Let us discuss this more fully: Strong iron, as distinguished from hard iron, may be said to be iron with high tensile and bending strength, but capable of machining without too much difficulty. This grade of iron is obtained by keeping the silicon down, say to 1.75 per cent; for high silicon iron, while soft and easily machined, is weak. Low silicon iron gives close grained, strong castings, which if poured at as low a temperature as possible will not contain an excessive amount of combined carbon. The desirable qualities of a soft, light, high silicon iron casting will not be found in this material; for, to obtain strength, ease in machining must be sacrificed; and the solution of the problem of obtaining great strength combined with convenience in working is to be found in the malleable casting.

When, however, this degree of strength is not required, and it is essential to have a thin casting which can be machined readily, a high silicon pig may be used, and steel scrap added to reduce the total carbon, thus leaving less graphite to cause planes of weakness in the resulting product. Iron of this kind must be well mixed before pouring. It is apt to be full of gas and hence a very little ferro-aluminum or ferro-manganese stirred into the ladle will be found beneficial.

Finally, I am inclined to be a little skeptical regarding the correctness of the last pig iron analysis given. An iron having only 1.87 per cent of silicon should have more than .15 per cent combined carbon, unless indeed the sample was taken from the very center of the pig, in which case the application of Dr. Colby's recent excellent article on sampling pig iron would be self-evident and highly beneficial. I would also like to hear what foundrymen have to say on this interesting subject of strong and yet readily workable irons.

RICHARD MOLDENKE.

Pittsburg, Pa., June 6, 1898.

THE Edith furnace of the Oliver & Snyder Steel Co., at Allegheny, goes out of blast this week. The new stack is well under way and will probably be in blast by August 1. The present stack will be transformed into a dust catcher for a new furnace. The new furnace will be 100 feet high, 22 feet at the bosh and will have a hearth diameter of 13 feet. Its capacity will be 500 tons per day.

THE Chicago office of Rogers, Brown & Co., pig iron dealers, has issued a "Spanish-American War Atlas," containing maps of the world, United States, Spain, and other maps of interest in following the course of the present conflict, and in addition a great deal of valuable printed matter relating to the war and the two countries involved. The atlas will be of great assistance to those who desire to keep the run of the campaign.

A FIELD FOR ALL-AROUND MACHINISTS.

In most cases a machinist is classed as a "good" workman, who can do a good job and do it quickly. This is supposing, of course, that he is industrious and reliable, as a man must be to amount to anything anywhere. At present nearly everything and everybody is specialized, and the better specialist a man is, the more he is worth. There is such a thing, however, as carrying the specializing idea to too fine a point in the machinist's trade.

It is certainly a mistake to specialize to the extent of becoming a first-class lathe or planer hand and nothing more. It is also a mistake to try to be proficient at anything from lapping out ring gauges to boring 60-inch steam engine cylinders. It is quite possible, however, to become at least a good all-around man in any distinct department, such as heavy machine work or the manufacture of duplicate parts, and it seems reasonable to suppose that the best machinist will be the one who, within reasonable limits, has the best all-around ability.

This is a point that young mechanics ought to remember. An apprentice may start in to learn the trade and perform faithfully the work that is set before him, becoming proficient enough in turning out accurate work at the end of his time to be classed as a good journeyman. But if he has done this and this only, he will have no more than touched the edge of what is rightly the machinist's trade. The machinist's trade includes everything that pertains to the actual construction of machinery in the shop. To become a good machinist one must look not so much that he becomes a good specialist, as that he becomes a good all-around man.

Take the question of milling. It is safe to say that the average machinist will not learn what he ought to know about it, either during his apprenticeship or afterwards, unless he makes an effort to find out about some things that do not come directly in his own path. Those who are lamenting because they have no opportunity to study will find plenty of chances to gain valuable information in a machine shop without going to school. Under the head of milling comes properly the study of the best methods of producing a vast number of duplicate parts; this class of work includes the use of the universal miller in tool making; it includes, also, the whole subject of gearing—the sizing of gear blanks for spur gears, the cutting of bevel and spiral gears and the hobbing of worm wheels. Here is chance enough for study, and while all these branches will seldom come within the experience of any one machinist, every machinist who pretends to do anything at all with the milling machine ought to make an effort to find out something about them. It is a question, moreover, whether he has really learned the machinist's trade until he has done this, and he certainly will not be in the way of earning as much money as he is capable of earning until he does it.—[Machinery.

Surprising Record of Manufactured Exports.

The manufacturers of the United States are making in the fiscal year which closes with this month their greatest record in competing for the markets of the world. Not only will the exports of manufactured articles for the fiscal year exceed those of any previous year, but for the first time in the history of the country they will exceed the imports of manufactures. In the ten months of the fiscal year ending with April, whose detailed record the Bureau of Statistics has just completed, the exports of manufactures exceed by over $40,000,000 the value of the manufactures imported, and it is probable for the full year's record this excess will reach $50,000,000.

In no preceding year in the history of the country have the exports of our manufactures equaled in value the imports of manufactured articles. In the fiscal year 1897, the imports of manufactured articles exceeded the value of exports of manufactures by the sum of $27,362,217; in 1896 by $104,759,734, and in 1895 by $121,413,783.

Nearly every branch of our manufacturing industries has shared in this growth of our sales to other parts of the world. The exports of agricultural implements, for instance, will, in the year 1898, be, in round numbers, $6,000,000. Locomotive engines, whose exportation in 1888 were less than $500,000 in value, will in 1898 reach probably $4,000,000. The total value of the exports of manufactures of iron and steel, which in 1888 amounted to $17,763,034, will in 1898 exceed $65,000,000.

AMERICAN FOUNDRYMEN'S ASSOCIATION.

(Special Dispatch.)

CINCINNATI, June 8, 1898.

The annual convention of the American Foundrymen's Association at Cincinnati this week has brought together the largest number of foundrymen ever assembled at one time. Delegates from various parts of the country commenced to arrive on Tuesday morning, and by noon over 150 had registered at the secretary's office in the Grand Hotel. The members and visitors are very enthusiastic over the welcome given them by the Cincinnati contingent, and over the prospects for a most successful meeting of the association. The Pittsburg and Chicago members were the first to arrive, coming on special cars over the Pennsylvania road. Both parties reported having had a very enjoyable trip.

There was no business meeting on Tuesday of the association, the day being given up to getting acquainted with each other and with the city. Various trolley parties were organized to go to different parts of the city. The National Founders' Association, composed of foundrymen members of the American Association, and organized on the same line as the Stove Founders' Defense Association, held a business meeting, making a revision of the by-laws and discussing matters peculiarly applicable to the work of that body.

The regular business of the American Association commences today with addresses by the chairman of the local committee, D. McLaren, president of the Addystone Pipe & Steel Co., the mayor of Cincinnati, and others.

The names of those registered on Tuesday, with their business connections, is as follows:

Members. — Jos. T. Best, Warden, King & Son, Montreal, P. Q.; I.W. Frank, Frank-Kneeland Machine Co., Pittsburg, John A. Penton, the *Foundry*, Detroit; T. L. Griffith, Hill & Griffith Co., Cincinnati, O.; John Hill, Hill & Griffith Co., Cincinnati, O.; J. D. Smith, J. D. Smith Foundry Supply Co., Cincinnati, O.; J. W. Fleig, J. D. Smith Foundry Supply Co., Cincinnati, O.; W. H. Pfahler, Abram, Cox Stove Co., Philadelpha, Pa.; C. T. Holbrook, Davis Coal & Coke Co., Philadelphhia, Pa.; F. S. Cadwell, Hill & Griffith Co., Cincinnati, O.; H. F. Frohman, S. Obermayer Co., Cincinnati, O.; G. P. Buckingham, Arcade Malleable Iron Co., Worcester, Mass.; L. S. Brown, Springfield Facing Co., Springfield, Mass.; J. S. Koons, Lehigh Valley R. R., Weatherly, Pa.; T. H. Colvin, Colvin Foundry Co., Providence, R. I.; Geo. H. Lincoln, G. H. Lincoln Iron Works, Boston, Mass.; J. F. Lanigan, Davis Foundry Co., Lawrence, Mass.; Victor Swenson, Condor Iron Foundry Co., Boston, Mass.; Stephen Holman, Deane Steam Pump Co., Holyoke, Mass.; C. L. Newcomb, Deane Steam Pump Co., Holyoke, Mass.; Edw. Maher, Maher & Lockhart, Newark, N. J.; B. Gomersall, Leland & Faulconer Mfg. Co., Detroit, Mich.; R. Vial, Brown & Sharpe Mfg. Co., Providence, R. I.; John R. Russel, Russel Wheel & Foundry Co., Detroit, Mich.; J. S. Seaman, Seaman, Sleeth Co., Pittsburg; Dr. R. G. G. Moldenke, McConway, Torley Co., Pittsburg; Henry Hansen, the *Foundry*, Detroit; M. F. Moore, L. F. Moore & Sons Co., Elizabeth, N. J.; John Kane, Keer-Murray Mfg. Co., Ft. Wayne, Ind.; J. A. Logan, Pittsburg; John F. Mills, Abendroth Bros., Port Chester, N. Y.; J. J. Burgen, Lane Mfg. Co., Montpelier, Vt.; S. D. Sleeth, Westinghouse Air Brake Co., Pittsburg; C. A. Sercomb, Milwaukee, Wis.; B. D. Northrop, Washington, Pa.; H. M. Leland, Leland & Faulconer Mfg. Co., Detroit; H. M. Wilson, Taylor-Wilson Co., Pittsburg; J. S. McCormick, Pittsburg; Phillip Mathes, Brittain & Mathes, Pittsburg; J. W. Treat, C. A. Treat Mfg. Co., Hannibal, Mo.; L. D. Gilbert, Frick Co., Waynesboro, Pa.; B. T. Bacon, Pickands, Brown & Co., Chicago; Wm. Yagle, Wm. Yagle & Co., Pittsburg; D. G. Moore, Samuel L. Moore & Sons Co., Elizabeth, N. J.; W. A. Jones, W. A. Jones Foundry & Machine Co., Chicago; B. M. Gardner, *The Iron Trade Review*, Chicago; L. Wolff, L. Wolff Mfg. Co., Chicago; Frank B. Ward, Mich. Brass & Iron Works, Detroit; S. T. Johnston, S. Obermayer Co., Chicago; G. W. Cope, the *Iron Age*, Chicago; L. E. Bellows, Deane Steam Pump Co., Holyoke, Mass.; E. J. Lyon, Brown & Sharpe Mfg. Co., Providence, R. I.; E. S. Reed, Whiting Foundry Equipment Co., Chicago; J. K. Pollock, Rogers, Brown & Co., Cincinnati; C. J. Langdon, Fulton Foundry Co., Cleveland, O.; W. T. White, J. D. Smith Foundry Supply Co., Cincinnati, O.; J. A. Stone, Riverside Foundry Co., Cleveland, O.; J. P. Golden, Golden's Foundry & Machine Co., Columbus, Ga.; O. T. Davis, Frick Co., Waynesboro, Pa.; John G. Sadler, Springfield Foundry Co., Springfield, O.; M. L. Milligan, Springfield Foundry Co., Springfield, O.; Geo. McG. Morris, Geo. C. Morris Foundry Co., Cincinnati, O.; E.W. Huston, Snow Steam Pump Works, Buffalo, N. Y.; H. E. Morrill, Dayton Malleable Iron Co., Dayton, O.; Robert C. Folney, Lobdell Car Wheel Co., Wilmington, Del.; E. H. Munford, Tabor Mfg. Co., Elizabeth, N. J ; Archer Brown, Rogers, Brown & Co., New York; D. B. Meacham, Rogers, Brown & Co., Cincinnati, O.; W. C. Herron, Rogers, Brown & Co., Cincinnati, O.

Guests.— Joseph Valentine, *Iron Molders Journal*, Cincinnati, O.; David Black, *Iron Molders' Journal*, Cincinnati, O.; Martin Fox, Cincinnati, O.; H. P. Deuscher, H. P. Deuscher Co., Hamilton, O.; A. Cunningham, Luhrig Coal Co., Cincinnati, O.; J. H. Pepper, Philadelphia, Pa.; C. A. Stevenson, Stevenson, Field & Co., St. Louis, Mo.; Chas. S. Woodward, Domhoff & Joyce Co., Cincinnati, O.; M. H. Fletcher, Cincinnati, O.; Geo. C. Avery, B. F. Avery & Son, Louisville, Ky.; T. J. Joyce, Domhoff & Joyce Co., Cincinnati, O.; John Sargeant, Domhoff & Joyce Co., Cincinnati, O.; J. W. Gardner, Gardner Governor Co., Quincy, Ill.; Samuel H. Whitaker, Dayton Coal & Iron Co., Cincinnati, O.; W. L. Turner, Matthew Addy Co., Cincinnati, O.; Edwin McFarland, Matthew Addy Co., Cincinnati, O.; James A. Green, Matthew Addy Co., Cincinnati, O.; Lazard Kahn, F. & L. Kahn & Bro., Hamilton, O.; C. A. Truesdale, Wm. Resor & Co., Cincinnati, O.; E. Kemper, American Manufacturer, Cincinnati, O.; J. D. Rogers, Safety Emery Wheel Co., Springfield, O.; A. Helmboldt, Newport Iron & Brass Foundry Co., Newport, Ky.; Henry Schuh, Newport Iron & Brass Foundry Co., Newport, Ky.; Eliot A. Kebler, Matthew Addy & Co , Pittsburg; H. D. Erhart, Cincinnati, O.; Jay Gould, Industrial Foundry Co., Cincinnati, O.; Geo. Webb. Industrial Foundry Co., Cincinnati, O.; J. R. McFarland, L. Jones & Son, Cincinnati, O.; E. P. Jones, L. Jones & Son, Cincinnati, O.; C. H. Domhoff, Domhoff & Joyce Co., Cincinnati, O.; J. W. Foley, J. W. Foley & Co., Cincinnati, O.; C. R. Stephens, Moline Plow Co., Moline, Ill.; Al. Cordingly, Queen City Foundry Co., Denver, Colo.; Shelby Compton, Niles Tool Works, Hamilton, O.; Henry Smith, *The Iron Age*, Cincinnait, O.; John Grant, Valley Iron Works, St. Paul, Minn.; G. H. Palmer, Palmer & Demooy Foundry Co., Cleveland, O.; F. J. Patterson, Patterson Foundry Co., Cleveland, O.; C. T. Morey, Deere Co., Moline, Ill.; S. J. Raine, *Post*, Cincinnati, O.; H. L. Matthews, Decatur Malleable Iron Co., Decatur, Ill.; Rolston H. Goss, *Times Star*, Cincinnati, O.; J. P. Gardner, Cincinnati, O.; W. H. Wells, Holly Mfg. Co., Lockport, N. Y.; B. R. Marchand, Illinois Steel Co., Chicago; A. McThompson, Link-Belt Machinery Co , Chicago; C. L. McNamara, Cincinnati, O.; A. W. Bair, C. M. & St. P. Railway Foundry, Milwaukee; Geo. S. Caruthers, Pittsburg; D. Gallagher, T. P. Kelly & Co., Chicago; C. W. Jackson, Chicago; J. E. Fisher, Nat. Transit Co , Oil City, Pa.; James Barclay, Deere-Mansur Co., Moline, Ill.; E. P. Wilson, Cincinnati, O.; A. Phenis, *Commercial Tribune*, Cincinnati, O.; D. C. Shears, Cincinnati, O.

National Founders' Association.

A meeting of the National Founders' Association organized in New York, a few months ago, was held at the Grand Hotel, on Tuesday. Two-thirds of the enrolled members were present. The constitution provisionally adopted at New York was ratified and the annual election was held, resulting in the choice of the following:

President, P. W. Gates, Gates Iron Works, Chicago; Secretary, John A. Penton, Detroit; vice-president, C. L. Newcomb, Deane Steam Pump Co., Holyoke, Mass; treasurer, W. H. Wells, Holly Mfg. Co., Lockport, N. Y.

District committees were named as follows: First district.— L. E. Bellows, Deane Steam Pump Co., Holyoke, Mass.; W. A. Barbour, Barbour-Stockwell Co., Boston; W. H. Carpenter, A. Carpenter & Sons Co., Providence; G. B. Buckingham, Arcade Malleable Iron Co., Worcester, Mass.; James F. Lanigan, Davis Foundry Co., Lawrence, Mass.

Second district.—M. F. Moore, S. L. Moore & Sons Co., Elizabeth, N. J.; A. J. Caldwell, Henry R. Worthington, Brooklyn; D. T. Campbell, Watts-Campbell Co., Newark, N. J.; Ed. Maher, Maher & Flockart, Newark, N. J.; Geo. H. Cushing.

Third district. — Geo. L. Romiger, Girard Iron Works, Philadelphia; Robert Taylor, Taylor-Wilson Co., Allegheny, Pa.; Frank Moore, Pittsburg Malleable Iron Co., Pittsburg; two members yet to be chosen.

Fourth district.—J. A. Stone, Riverside Foundry Co., Cleveland; J. F. Llewellyn, Belle City Malleable Iron Co., Racine, Wis.; H. M. Leland, Leland & Faulconer Mfg. Co. Detroit; C. M. Power, St. Paul Foundry Co., St. Paul.

Fifth district.—Members yet to be chosen from the Southern States.

A brief meeting of the association was held Wednesday morning and the new president, P. W. Gates, who had just arrived in the city, was introduced by Wm. H. Pfahler, retiring president, and made an excellent address. The recommendation of the committee on secretary's salary that it be one thousand dollars, was adopted.

Wednesday Morning.

President Francis Schumann, of Philadelphia, called the convention to order at 10:30, Wednesday morning, in the Assembly room of the Grand Hotel. About 150 were present.

President D. McLaren, of the Addyston Pipe & Steel Co., welcomed the convention on behalf of the local foundrymen and E. P. Wilson, secretary of Cincinnati Trades League, seconded the welcome on behalf of Mayor Tafel, and W. B. Melish, president of the league. James Bowron, first vice-president of the Tennessee Coal, Iron & Railroad Co., then addressed the convention, teiling with splendid effect the story of the wonderful iron development of Alabama. A significant incident of the export pig iron trade which he mentioned, was the shipment of 600 tons last week into the town of Middlesbrough, Eng., under the very shadow of her famous blast furnaces. Remarks by Lazard Kahn, of Hamilton, and D. B. Meacham, representing local reception and entertainment committees, followed, and President Schumann, on behalf of the association. The report of Secretary Penton for past year showed good progress, 70 active and 10 associate members having been added.

Wednesday Afternoon.

At Wednesday afternoon's session papers were read as follows: "The Molder of the Future, and the Need of an Adequate Apprenticeship System," by P. W. Gates; "The Adoption of a Standard System of Test Bars for Cast Iron," by R. G. G. Moldenke, E. M., Ph. D.; "A Talk on Brass Founding," by Chas. Vickers; "A Test for Determining the Hardness of Cast Iron," by C. A. Bauer; "Manganese in Cast Iron," by Guy R. Johnson.

Obituary.

John Wood, long a prominent figure in the iron trade of Eastern Pennsylvania, died at Conshohocken, Pa., May 29, aged 81 years. He had been for many years president of the J. Wood & Bros. Co., owners of the Conshohocken, Pennsylvania & Corliss Iron Works, and lessees of the Plymouth Rolling Mill at the same place. When a young man, John Wood was associated with his father, James Wood, and elder brother, Alan Wood, as James Wood & Sons, manufacturing shovels and spades and agricultural implements at 223 N. Second st., Philadelphia. In 1832 the first sheet iron mill in the Eastern part of Pennsylvania was erected by his father at Conshohocken and has been in constant operation ever since. After the death of his father, in 1851, Mr. Wood, associated with his brothers, William W. Wood, Thomas C. Wood and David L. Wood, continued the business under the name of J. Wood & Bros. Co. The business was materially increased by the erection of large mills in 1853, which have been running continuously ever since, employing between 300 and 400 hands. Mr. Wood was an active Republican and represented his district in Congress in 1858 and 1860.

The death of N. D. Moore is reported at Spokane, Wash. His name was prominent in connection with the opening of the Gogebic range. It is stated that he retrieved his losses in part, in the past few years.

John F. Pankhurst, of the Globe Iron Works Co., Cleveland, died suddenly June 2. With Henry D. Coffinberry and Robert Wallace, now of the Cleveland Ship Building Co., he engaged in a long struggle with vessel owners to secure the first orders that resulted in replacing wooden ships by steel carriers. Mr. Pankhurst was born in Cleveland, March 28, 1838. His first business venture was in a small machine shop, conducted by the firm of Wallace, Pankhurst & Co. Then came the Globe Iron Works, in which Robert Wallace, Henry D. Coffinberry, and John F. Pankhurst were jointly interested. The separation of these gentlemen in 1886, after they had built a few steel vessels, was followed by the formation of Cleveland's two ship building concerns, the reorganized Globe Iron Works Co., and the Cleveland Ship Building Co. Mr. Pankhurst was joined by the Messrs. Hanna and Luther Allen, of Cleveland, in the Globe Iron Works Co., and was the active manager of its affairs.

Lake Superior Iron Mines.

The annual meeting of the Chandler Iron Co., with iron mines at Ely, Minn., was held at the offices of the company in Chicago, May 31. Directors were elected as follows: D. H. Bacon, J. H. Chanldler, C. P. Coffin, of Chicago, H. R. Bishop, of NewYork, and Harvey H Brown, of Cleveland. The officers elected were C. P. Coffin, president and treasurer, J. H. Chandler, vice-president; L. T. Beecher, secretary.

The Chandler mine, located at Ely, Minn., has stopped the night shift, which throws 250 men out of employment. The property has about half a million tons of ore in stock, and this leaves but 200,000 tons more to make up its allotment. The miners who are thus derived of work can readily find employment at other places throughout the country, as there is a call for men at many of the mines.

The largest ore cargo ever taken from Lake Superior was loaded by the Superior City at Two Harbors last week, the vessel taking out 6,093 gross tons, equivalent to 227,466 bushels of wheat.

Articles of association of the Vulcan Silica Iron Co., composed of C. S. Stuart, John T. Jones and others, were filed at Iron Mountain, Mich., last week. The business is to be carried on in the counties of Dickinson, Iron, Marquette, Gogebic and Delta.

The new dock of the Chicago & Northwestern Railroad, at Escanaba, will soon be ready for operation. It is expected that Escanaba will make close to a 4,000,000 ton record this year.

The Minnesota Railroad Commission has decided to hear testimony in the iron rate cases of Brown vs. the Duluth & Iron Range and the Duluth, Missabe & Northern Railroad, July 12. The hearing will begin at 10 A. M. in Duluth.

The estimated production at the Fayal mine for 1898 is 700,000 tons.

Shipments from the Biwabik mine are at a rate between 600,000 and 700,000 tons for the season.

At the Oliver mine daily shipments are about 1,200 tons, from one shovel. This amount will be increased soon. About 130 men are employed. At Mountain Iron mine daily shipments are about 2,000 tons. At Oliver one shovel is in the stripping. At Mountain Iron three shovels are stripping, and a large force is employed.

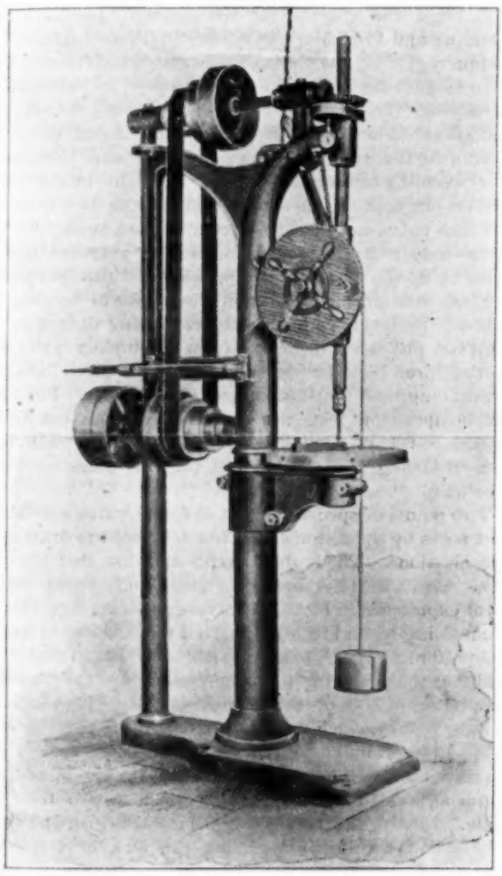
Splendid Crop Prospects.

A glowing crop report has just been issued by the *American Agriculturist*, relating to wheat acreage and condition. The report states that in the winter-wheat belt there is an apparent increase of 7.2 per cent over last year's harvest area, and for the whole breadth of spring-wheat territory the consolidated estimates show an increase over last year's estimate of 17.3 per cent. This makes the winter-wheat acreage 25,651,000 and spring wheat 17,868,000, or a total of 43,519,000 acres, against 39,167,000 acres in 1897. The excellent weather conditions last fall, the high price of wheat at that time the still higher price since, and the ideal weather conditions under which seeding was prosecuted, all conspired to urge farmers, especially in the spring-wheat sections, to seed every possible acre. With the exception of California, every State in both the spring and winter wheat belts has enjoyed an ideal season up to date for plant development, and the general conditional average is remarkably high, that for winter wheat being placed at 90.7 per cent and for spring wheat at 99.1 per cent of a practically perfect condition at the time of the report.

A TEST FOR HARDNESS OF CAST IRON.*

BY CHAS. A. BAUER.

Inasmuch as none of the previously known methods for determining the hardness of cast iron had proven to be practical for a number of reasons, foremost among which was the impossibility of duplicating the results obtained, which was sufficient in itself to demonstrate that the method in question was unsatisfactory in character, it became imperative that some method be devised that would be simple and yet reliable, and which would contain none of the objectionable features which are known to exist in other methods. As the previously mentioned tests were merely superficial, dealing solely with the character of the surface of the metal, which is no indicator of the nature of the material beneath it, we can readily see at what a loss any manager must be who depends upon such tests to control the hardness of his castings. Since the everyday use of these tests was impractical, the physical characteristics of the foundry product was determined by inquiries directed to the heads of the different



departments where machine work was done. The results obtained in this way being conflicting, and in many cases contradictory, made it necessary to inculcate into the new method mechanism which was absolutely automatic, in order to eliminate any possiblility of personal equation entering into and affecting the results of the tests.

From the fact that a drill running at a uniform rate of speed and under a constant pressure, the number of revolutions which would be required to drill a given depth would be directly proportionate to the hardness of the material being tested, it was deemed expedient to formulate a method along these lines.

An ordinary drill press was equipped as follows: On the pinion shaft, which raises and lowers the spindle, is attached a disc 12 inches in diameter, around the periphery of which is placed a light flexible wire cable, on the end of which is suspended a weight which maintains a constant pressure upon the drill. The standard drill is now placed in the chuck. The drill spindle has a revolution counter, and by means of magnets and an armature is controlled by the position of the drill in relation to the table. All adjustments are made so that the revolution counter is thrown into gear after the point of the drill is entirely embedded under the surface of the test piece, and out of gear when the spindle has descended from this point exactly one-half inch.

When the test is to be made the test bar is placed upon the table and the drill is brought down upon its surface; the feed lever is then unlatched and everything is ready for the test. The drill is now rotated at a speed of 250 revolutions per minute, and the hole drilled. The revolution counter is electrically thrown into gear after the drill point is buried beneath the surface, and out of gear when the one-half inch from this point has been reached. The reading of the revolution counter now gives us the exact number of revolutions required to drill the one-half inch, and this we term the degrees of hardness. The more revolutions required the harder the casting; slight variations in hardness being easily detected.

We have adopted, and would recommend as a standard, a ¾-inch flat drill having an angle between its cutting edges of 120 degrees and a clearance angle of 10 degrees, running at a speed of about 250 revolutions per minute and having a constant pressure of 160 pounds.

A flat drill has been adopted on account of the facility with which it can be ground to the proper angles. The cutting angle may vary between 115 degrees and 125 degrees without affecting results, but the clearance angle should be 10 degrees. The revolutions of the drill may vary between 240 and 260.

The pressure on the drill should be as near 160 pounds as possible in order to compare with results obtained elsewhere by this method, and should be determined while the drill is in motion. We have placed a small platform scale upon the drill table, then placed the test-piece on this scale and found the pressure to be 160 pounds while making a test.

After the apparatus has been prepared and standardized, it is well to determine the hardness of a long test piece, which should then be put away and preserved as a standard. Any changes which may then take place can be entirely eliminated and results reduced to the standard by the formula,

$$\text{Degree of hardness} = \frac{Dr}{R},$$

in which D = the degrees of hardness of standard test piece; R = the number of revolutions of drill required to drill that piece under present conditions, and r = the number of revolutions obtained in drilling the piece, the hardness of which we wish to determine.

We make daily tests of our cast iron and mark each piece with its determined degree of hardness, and use any one of them to determine the change in the drill.

We have selected four test bars which represent four grades of hardness. Castings for our purpose should range between that determined for Bars Nos. 2 and 3; No. 1 would be considered too soft, while No. 4 would give us trouble in the machine shop and would surely bring in complaints. We repeated the hardness test on each bar, obtaining three results for each bar. We herewith submit results of these tests:

Bar.	Hardness.		
No. 1,	130	128	129
No. 2,	150	149	149
No. 3,	170	168	167
No. 4,	236	232	230

The greatest variation of results occurred in the drilling of the fourth bar, where it was less than three per cent. We therefore believe that we have a reliable test and one that will prove of great practical value to all foundrymen.

* Read at the Cincinnati meeting of the American Foundrymen's Association, June 7-10.

THE Norton Emery Wheel Co., Worcester, Mass., and 25 South Canal st., Chicago, has just issued a new edition of its catalogue. It is well designed, is printed on good paper, standard size, and contains a full list of the company's products. These embrace emery and corundum wheels of all kinds, emery stones, India oil stones and grinding machinery.

THE Garden City Sand Co., Security Bldg., Chicago, dealer in sand, fire brick, fire clay and other foundry and furnace supplies, has sent out a very neat little pocket memorandum book, with celluloid covers, containing in the back pages postal rates and other useful information.

THE ADOPTION OF A STANDARD SYSTEM OF TEST BARS FOR CAST IRON.*

BY DR. RICHARD MOLDENKE.

The expansion of the general iron trade within the last quarter of a century has been phenomenal, and is bringing with it the natural demand for furthur and greater efforts on the part of those engaged therein. Raw materials as well as finished products have been cheapened to an extent which makes our veterans sigh for the good old times of war prices; but the demand for quality has kept pace with the requirements of a more commercial character.

To-day a manufacturing founder who uses finished steel in connection with his castings when assembling his product, demands, or should demand, guarantees from the mill which will ensure for him the best material for his purpose. Competition will give him this at market prices if he knows what to ask for and how to ask it.

Similarly the manufacturer who buys castings has a right to ask for and receive the highest product of the molder's skill, combined with a material best suited to the work and the service it must endure. How shall the consumer know when he is getting the best castings for his purpose, or the founder that he is making them and is thus holding his trade? So far as the material is concerned, only by some means of comparison with well selected standards.

The fact that the knowledge and consequent use of such standards is as yet in a very crude state, as indeed are also the methods by which comparisons are made, will account in a great measure for the many disputes between buyer and seller, leave the foundryman in constant anxiety regarding the behavior of the material after it leaves his eves, and will sometimes make him feel that the quality of this daily product is a matter of mere guess-work.

It may not be generally known that now and then a contract awarded on given quotations is refused when it is learned that such and such an inspector is to look after its performance. An additional percentage is asked for, to cover the expense incident to the unnecessary and vexatious demands such a man is notorious for making. This is in a measure due to differences in the interpretation of contract clauses not based upon definitely specified tests. Instances of large consumers of foundry product laying down laws for their own are multiplying. The intentions are usually fair, but those who know what manipulation a test bar may be made to undergo, sometimes find competitors taking advantage of this fact; or if compelled to work under specifications not suited for the purpose, will soon realize the uncertainty existing, and frequently have good castings condemned on the strength of a poor system of tests.

Early attempts at securing uniformity in testing materials for structural purposes emanated from the parties most interested, not only great consumers, but the actual owners of the works turning out these products. The supposedly disinterested portion of the trade, the practical investigator and the scientist, is only now coming to the front as an aid in solving problems well known to exist but not easy to fathom out.

A real need exists for means of comparison with standards by uniform methods. To quote from the report of the famous Munich convention, "it is universally acknowledged at the present day that the testing of materials of construction for their mechanical properties can be productive of comparable results, but only when made in accordance with uniform testing methods."

The question of selecting the proper standards of quality is one foreign to this paper. Every man makes them for himself, if indeed these standards are not made for him by his customers. It is the aim of every progressive foundryman to know not only what kind of material his competitor is turning out, but also to see that he himself is doing at least as well. The method by which he may be reasonably assured of his standing as a foundryman, so far as the quality of the iron in his castings is concerned, is the study requiring our more immediate attention.

In matters relating to the founding of iron commercially we are undoubtedly ahead of European practice. This fact is shown by the immense and intricate castings for dynamos made here readily, whereas in Europe forgings of ingot iron or low carbon steel as we call it here, are found necessary to give satisfactory results. When it comes to a close study of the material we are working with daily, however, continental Europe at least is pushing us very hard.

It would carry us too far to go into the history of progress toward uniformity in methods of testing iron and steel. So much can be said, however, that not only has the work of unification been carried on by individuals and societies here and abroad, but commissions have been appointed by various governments for this purpose, and especially now does there seem to be some prospect of success, as nearly all concerned are uniting their efforts, and contributing their experience, for the general good through the medium of the "International Society for the Unification of the Methods of Testing Materials of Construction."

It remains for us to look more closely at the present status of the testing question from our standpoint as foundrymen, to see what information of value we may derive thereby, and how we can contribute our share to the general understanding of this most interesting material—cast iron.

Through the courtesy of the eminent metallurgists Dr. Wedding and Prof. Martens, of Berlin, I have obtained information regarding the German practice, which is also said to be in current use in Continental Europe In substance, it is as follows: Test bars 1 1-5 inch by 1 1-5 inch in cross section and 44 inches long are cast in dry sand molds inclined one inch in 10, the runner acting as feeder and pressure head corresponding to a vertical height of eight inches. An extension one inch by one inch is cast on the bar from which one inch cubes can be cut for compression tests. Of the 44 inches only 40 are intended for testing purposes, the transverse being the first method applied. For this purpose three of these bars are taken and their resistance to bending up to rupture together with the corresponding deflection noted. Two test pieces are turned up from the broken parts of each of the three bars for tensile tests, each piece being eight inches long, and four-fifths inch in diameter. Furthermore six compression tests are made with cubes cut from the broken test bars above mentioned, two from each bar, the pressure being applied as if the original piece were used as a column.

Two points of special interest to foundrymen are added as foot notes by the commission which labored to draw up these specifications. The regret is expressed first that the area of cross section of these bars is so small, and second that sufficient experience in casting bars on end is lacking. This would seem to imply, and rightly too, that this method of casting is the preferable one. Without wishing to be critical I might add that the neglect of a proper regard for the teachings of experience in both of these directions will prove fatal to any testing system which may be devised.

While tests similar in part to the above are in use in isolated instances in England and America, yet the testing of cast iron, so far as a uniform system is concerned, is in a truly chaotic state. Indeed, the famous English metallurgist, Mr. Hadfield, of Sheffield, writes me deploring the lack of uniformity in this regard and wishes us success in accomplishing something of practical value in this broad and imperfectly cultivated field.

It is, however, not to be understood that there has been a lack of practical and hard work in this direction by our investigators. It is with considerable trepidation that I address you on this subject, when I review the voluminous and excellent work brought out especially in the last few years, by the members of our engineering and other societies from the more practical standpoint, and our professors from the purely scientific in addition. Indeed the foundation of what knowledge of the properties of materials I myself possess, was laid through the remarkably clear and thorough instruction of Prof. Hutton, whom you all know. Looking over the scope of the work done by the society of which he is secretary, and Messrs. Henning and Keep of its committee on testing methods, one is struck by the great mass of results obtained. Then again the mining engineers have among their transactions excellent literature on the physics of cast iron. The civil engineers, who have done much in the direction of standardizing methods, the rail sections and chemical methods

* Read before the American Foundrymen's Association, Cincinnati, O., June 8, 1898.

for instance, are awaiting at the present time the action of the international society regarding further extensions of this work. Then come our independent investigators, Mr. West for instance, who not only bring out new lines of research, but help by their well meant criticism and effective counsel and work, to stimulate the larger bodies into higher planes of effort.

Thus we see there is a live and healthy movement in progress, in which it seems to me the time has come for us foundrymen to take part. At the outset I will say that there is only one way to ultimate success, and that is through a hearty co-operation with all engaged in similar lines of work. While we all look to an ultimate settlement of the testing question, through the authority and standing of the international society, of which I sincerely hope we will become a member shortly, yet it is absolutely necessary that the pioneer work be done in national circles first, and the data thus collected and digested be submitted to conference committees of the international society for final adjustment and promulgation.

The question of testing cast iron is not as simple as it looks. A thousand and one items have their influence upon the ultimate result. Take the constitution of the metal in its broadest sense, and you have essentially a mineral which may, but very likely will not, be uniform in its structure. Some portions then are bound to be weaker than others, and to my mind only a plentiful multiplication of these variations, or in other words a good big cross section, will give approximately correct results. These points, as well as many others of interest and importance, have been ably brought out by Mr. P. Kreuzpointner recently, and will be drawn upon freely further on.

We all recognize the fact that after all the judging of quality in a material by means of test bars can only be a relative one. Steel, after casting, is subjected to a variety of heat and working processes, leaving the structure of the finished product in a very different form from that of the original. Cast iron, on the other hand, remains just as cast. As there is no possibility of wiping out the chilling effect of the mold, the variation in structure due to casting temperatures, rate of cooling, etc., the test bars by which a casting is to be judged should approach as nearly as possible the peculiar conditions obtaining at the time. Is this possible or practicable? I fear not. And this is why there is such diversity of opinion on the subject among practical foundrymen.

A review of the results obtained by the committee on testing methods of the American Society of Mechanical Engineers corroborates this, the discussions showing that while the results themselves can and will stand upon their own merits, their interpretation is by no means settled, and will change as our insight into the material becomes better. It is therefore very proper that the final report should be delayed until all the data are thoroughly digested and every hiatus is filled out by the results of new lines of research.

What we foundrymen want just now is some system which will become quickly available, based if possible upon the experience already at hand, or requiring only a short time to perfect,—a system which is cheap, quickly and easily carried out, and which gives trustworthy results. It has always struck me that the existing methods are not practical enough. Thus the German specifications present difficulties of a serious nature. Casting 44 inch test bars of so small a cross section is not likely to give reliable results. The compressive tests of cubes of cast iron are not often carried out in this country, although cast iron is essentially the material best suited for compressive strain. Test bars turned down from square bars to round ones only four-fifths inch diameter will have four hard and four soft spots, so to speak, in the circumference of their fracture area. On the score of reliability and cheapness the German system therefore leaves much to be desired.

In daily foundry practice, when a contract for regularly furnishing certain kinds of castings is received, it is customary to break up the first one made to detect if possible any weakness due to the methods of molding employed. At the same time the iron used, the methods of pouring it, etc., come in for their share of close scrutiny. If this is not done the lesson is liable to be brought home very soon by the customer. Railroads do this with their own car wheels, axles, couplers, etc., as a regular method of testing the quality of the material on which so much depends. While this is the best way to assure oneself of the actual condition of affairs, the thing is not always practicable in the foundry trade. The next best method would be to cut out test pieces from finished castings rejected for some surface blemish not due to extremes of temperature of the iron poured. An opinion must now be formed as to the quality of the material and its adaptability for the purpose intended, and whatever system of testing is used for the daily work; this trial should always be made whenever expedient, to establish a relation between the general run of the metal and the actual results.

Now as to the regulation test bars which should show the quality of the material poured into castings. I will say at the outset that in my opinion a system involving the reproduction in every detail of the conditions coincident with the making of a casting, though very desirable, is a simple impossibility, and no reconciliation of opinions herein need be attempted. The only solution possible seems to be in avoiding as many of the disturbing influences as possible, and in this way aim to get the value of the material poured into the castings while in its best condition, rather than to obtain a poor imitation of the actual work. Good iron can easily be made worthless to a customer through poor molding and casting methods, but it would be folly to expect good castings with poor iron.

For the tensile test, then, a bar should be round and of large diameter. The peculiar requirements of the transverse test seem to demand a square and thick bar. Test bars should all be cast verticallly to avoid the variation in strength in the upper and lower sides when cast flat. The effect of a dry sand mold should be obtained to remove all disturbing influences due to the varying dampness of green sand molds. These are a few of the points to be considered in the making of the test bar, its preparation for the machine requiring further study. It remains for us to strike the best average of these variables, which from the nature of the case cannot be converted into constants, and this brings me to the following recommendations.

First.—That the American Foundrymen's Association authorize the appointment, by the president, of a committee on standard specifications for testing cast iron.

Second.—That the American Foundrymen's Association become a member of the International Society for the Unification of Methods of Testing Materials of Construction, following in this respect the example of all other large societies interested in industrial progress.

If I may be permitted to add a few suggestions concerning the work of such a committee, I would advise, first of all, friendliness and co-operation with all others engaged in the same lines of work. Next a careful study of the results already published, and a tabulation of what in the light of our present knowledge of cast iron is of real value. In the meantime a discussion of this subject by the various local foundrymen's associations would doubtless bring out much of value from the personal observations of the members and their friends. Some experimenting will be necessary, and plenty of hard work will surely fall to the lot of those honored by a call of this kind. It will be desirable to have a report prepared for our next meeting, even if not complete or wholly satisfactory to all; for what the foundrymen want is an immediate result in some definite direction. A report of this kind, if of sufficient value, can then be adopted tentatively pending further enlargement or improvement until finally merged into an international code for testing cast iron, in which I hope our American foundrymen will be heard from.

Should such a committee find time to enlarge the scope of their work more on the lines of the committee of the Mechanical Engineers, it might take up the question now being studied and warmly recommended to us by Mr. Henning, namely, the relation of expansion during cooling, and temperatures of cast iron. This and other questions relating to cast iron while fluid, during "set," and cooling, would bring out a fund of information not easily obtained through individual effort.

It would not seem right for me to conclude this paper without offering some idea of a practical kind as a suggestion to those interested in physical investigations. For many years it has been my observation that a long test bar broken near one end and tested again, would give higher results than be-

fore. I have been able to repeat this up to four times on the same bar, the final result being a goodly percentage higher than the original test. Now for steel and wrought iron Prof. Howe has ably discussed this phenomenon, and his "jog point," has become familiar to all testing experts. For cast iron, however, where the elastic limit is very close to the ultimate breaking strength, the elongation being for practical purposes a scientific curiosity, this cannot hold in so full a measure, and the test bar simply breaks at its weakest point. We get, then, not a measure of the quality of the iron but simply that of the weakest spot of that particular test bar. Test the bar again and the next weakest spot is shown, and

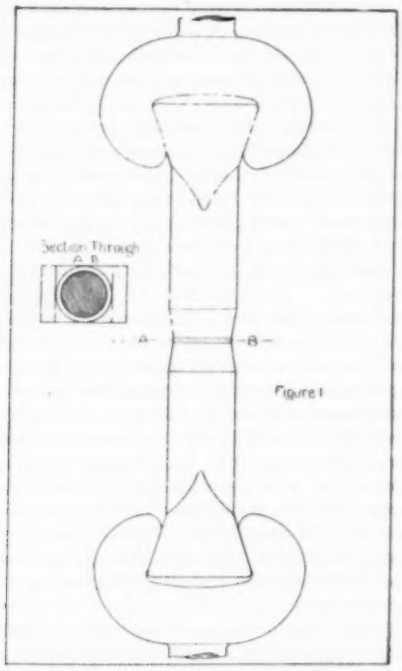


Figure 1

so on, until a fairer approximation of the actual conditions could be realized if the bar were long enough.

It was with great pleasure, therefore, that I saw in Mons. Barba's investigations a possible way out of this difficulty. He takes his test pieces and notches them deeply so that they must break at a given point. The probabilities are that this spot is most likely representative of the whole material, and not one of the weak places, a fact borne out by a wide range of experiments on iron and steel.

I would suggest now that this system be tried for cast iron, with this difference, however, that a test bar representing castings not to be machined should have the slight contraction provided for in the pattern; and for castings which require machining, the straight test bar should have a narrow groove turned into it. The accompanying cut will explain my suggestion more fully:

Fig. 1 shows the test bar in position for the tensile test. The contraction is shown at A B. It is only one-quarter inch smaller in diameter than the balance of the cylinder, and is made about one-eighth of an inch in length in order to overcome the difficulty experienced in obtaining a perfect V-groove in a casting. When the bar is to be machined, as stated before, the contraction A B is omitted and the V-groove turned into it before testing. It will be noticed that the ends are flat and taper outward, so that a bar may be held in solid clamps and be adjusted to receive the strain centrally. Since the taper is only on two opposite sides of each extremity of the bar, by laying it upon one of the other two, a transverse test may be carried out. Moreover, this arrangement makes the molding comparatively easy.

An experiment made with a bar of this kind, and another of a uniform diameter equal to the contracted portion of the first, both bars cast in the same dry sand mold, showed a slight difference in their fractures. The contracted bar broke at the center and was coarser grained at that spot than the other straight bar which, by the way, broke at one-third of its length from the end. This would show that the slower cooling of the metal in the heavier bar retarded the chilling of the contracted portion somewhat, resulting in a less marked contrast between skin and interior.

Now as I believe in having the thickness of the test bar comparable with the thickness of the casting, and as a two-inch specimen would seem the limit of capacity of our large foundry testing machines, I would suggest that at least three sizes, say, one inch, one and one-half inch and two inches, be selected, whether round, square, or both, as a committee may determine. In the plan I suggest for consideration you will notice that all shapes and sizes can be used, and where castings over two inches thick are to be represented, a two and one-quarter inch round bar with a one-quarter inch V-groove turned into it will, by the removal of the skin, give a fair representation of such heavy work, whether the castings are to be machined or not.

One last point: Not every foundry is prepared or willing to make dry sand molds, especially when a quantity of them are required daily. Fig. 2 shows a section through a green sand mold in which you will notice that the effect of the dry sand is obtained by having the contracted area in a core. Not only is there the advantage of making these cores perfect in shape and without parting lines, but also the fact that they can be kept in stock gives us the means of obtaining the required effect quickly and without trouble.

I feel that I have dipped but lightly into an intricate and at times aggravating subject. When one has made some

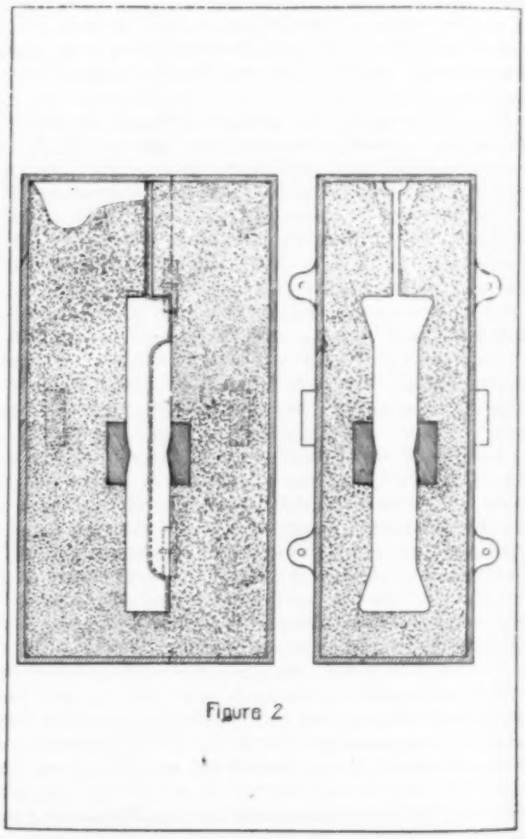


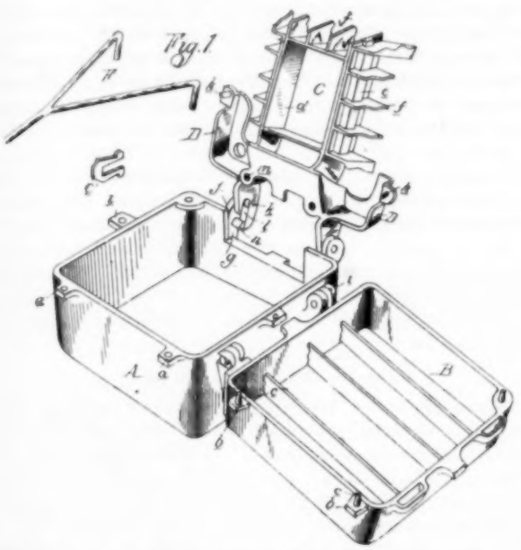
Figure 2

60,000 physical tests in the last six years, and realizes that although the test bars were made as representative of the material as possible, there can be no real comparison with the work of others in the same line of the foundry business, there need be little wonder why I have tried your patience today in urging quick and practical action by the American Foundrymen's Association on this important but still so unsettled question.

THE new East River bridge, on which work has been interrupted for some time, owing to the failure to provide necessary funds, now has a prospect of obtaining the needed appropriation. Since the new administration has been convinced that the city of New York is not in debt about $20,000,000, but really has a credit of $10,000,000 to her debt-creating power, some of this money is promised to the Bridge Commission. The amount wanted is about $4,000,000.

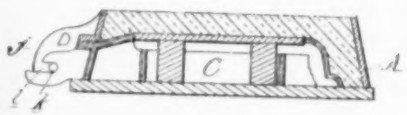
IMPROVED MOLDING FLASK.

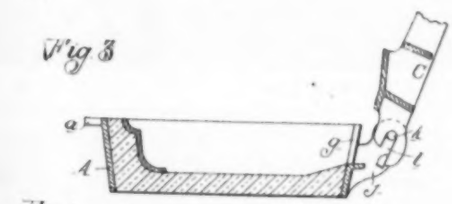
A new flask designed for use in casting hollow ware with green sand cores has been patented by Geo. W. Cope, of Detroit. The novel feature is the means employed for securing and guiding the anchor for the core, in addition to the special construction, arrangement and combination of parts of the flask. Fig. 1 is a perspective view of the flask as opened. Fig. 2 is a longitudinal section through a portion of the flask containing one part of the pattern, the anchor and the follow-

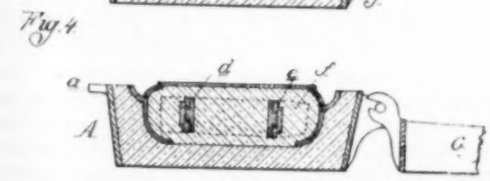


board. Fig. 3 is a similar view of the section reversed and the follow-board removed. Fig. 4 is a section at right angles to Figs. 2 and 3, with the core formed around the anchor and the remaining portion of the pattern in position.

The procedure in forming a mold with the flask is as follows: Supposing a hollow stove-base is to be cast, the first step is to place the anchor and one section of the pattern on the mold or follow-board. The section A of the flask is then placed around the pattern on the board, first engaging the pintle *k* with the slotted bearings *l*, and the sand is then filled in and rammed up, as shown in Fig. 2. The flask is then reversed, the follow-board is removed, and the sand for







the core filled in, rammed up, and stricken off, (Fig. 4), after which the remaining section of the pattern is placed in position, the upper section B of the flask turned down, and sand filled in and rammed up.

To remove the pattern, the section B is first turned back and the upper part of the pattern taken out. The core is then lifted by turning the anchor back on its hinges, which may be readily accomplished by engaging a hooked lever F, with sockets *m*, in the shank of the anchor. The lower part of the pattern is then removed, after which the core and section B of the flask are turned back in position and locked by placing the loops *c'* on the lugs *a b* and arms D and lugs *i*. When thus secured, the core will be held in precisely the same position as when the pattern was in the mold, on account of the guide-pins *h* engaging with the apertured lugs *i*. At the same time the core is held firmly against floating by the clamps securing the arms D to the lugs *i*.

With a flask thus constructed the work of forming the mold may be performed more expeditiously and accurately than with a flask in which the anchor is entirely separate therefrom and must be lifted bodily from the flask when the pattern is removed. With the latter construction it is generally necessary for two men to assist each other in lifting the core out of or back into the mold, as well as requiring the exercise of care in laying down the core that it may not be injured. With this flask one man by using the lifting lever F may turn up the core out of the mold, while suitable stops *n* on the lugs *j* serve to hold it in this position out of harm's way until it is to be replaced in the mold. Another advantage of this flask is that since the core is always replaced in exactly the same position in the mold the pattern may be made with less stock, and the casting with less metal, than where there is a chance for slight variation in position. The upper section of the flask and the anchor are hinged on adjacent sides of the lower section of the flask, so that the workman may have the remaining two adjacent sides of the flask free from obstruction.

The Cry of Iron Ore Monopoly.

The principal iron ore supply of the United States is about to be monopolized by Standard Oil methods, according to a wail in the Pittsburg *Post*, from which we quote as follows:

"The independent or smaller iron ore producers in Northern Minnesota appear to be sharing the fate which came upon the independent oil producers years ago, and at the hands of the same master in monopoly building. The Rockefeller ore combination is drawing into its clutches all within reach, and if the railroads are not working with it through discriminating rates against the independent concerns, as they worked with the Rockefeller Standard Oil conspiracy, many people in that section will have guessed wrongly. Speaking of the rapid absorption of the small concerns on the Mesabi range, a prominent Duluth miner says: 'It means that some fine day the iron interests of the country will wake up and discover that there is not a mine to be had in Minnesota, and the furnace men will be buying ore of their strongest competitors. It means that the Carnegie-Oliver combination and the Minnesota Iron Co. propose to dictate to the iron interests of the United States and control absolutely the cheaply worked iron mines of Minnesota, the cheapest-worked properties on the planet. They will be in a position to put the price up or down to suit their purpose, which will ever be to extend their power over the production of ore. The railroads, knowing where their interests lie, are hand and glove with the Carnegie-Oliver people.'"

If the railroads are, as hinted by the *Post*, discriminating against the independent ore producers, that is a wrong which should be remedied by the Interstate Commerce Commission. [There is but one rate of freight on all Mesabi ores.—Ed.] But in other respects the so-called monopolizing of the iron ore production of Minnesota by a few strong companies is only a step forward in economic progress, and one which is in the direction of cheapening the cost of steel to the public at large, and of enabling the steel makers to export a considerable part of their product in competition with England and Germany. The principal human cause which enables this country to export steel rails to-day is the work that has been done by the large companies in cheapening the cost of mining and transporting ore. Small mining corporations could never have gone to the expense of providing the magnificent ore handling machinery on the docks, and the fine railroad and vessel equipment which are now used and which are necessary to the furnishing of cheap iron ore to the furnaces. If the iron interests of the country are to "wake up and discover" any thing, it will be that the iron interests, that is, the owners, of steel rail, wire and sheet mills are also owners of blast furnaces, of ore and coal mines, of coke ovens, of railroads, of lake vessels, and of docks. It is by combining the ownership of all these necessary parts of the iron manufacturing industry that an iron-making company is enabled to make and sell cheap steel and thus to become a benefactor to the public.—[Engineering News.

THE USE OF NAPHTHA FUEL GAS.

That gas is the ideal fuel for mechanical heating operations has been so well demonstrated by experience that gas will naturally displace coal and crude oil wherever it can be produced at sufficiently low cost. Natural gas has been an unalloyed blessing wherever found, but the immense quantity consumed where it displaced crude fuels has created the impression that artificial gas could not be made cheap enough to compete with coal or crude oil. It is to be considered, however, that in the natural gas belt no pains have been taken to economize gas, but on the contrary it has been uniformly wasted, only a small proportion of the consumption being utilized. The common practice has been to convert the existing coal furnaces and ovens into "gas furnaces" by running gas pipes into them without provision for mixing the gas with the proper proportion of air needed for its perfect combustion; and for distribution of the heat the old draft flues have been utilized, and draft relied upon for the necessary air supply. Under such conditions no artificial gas could be used profitably. If, however, the best available means for making gas from coal or petroleum are utilized, and the gas is used in modern gas furnaces, so great a saving in the gas consumption has been demonstrated as to make the use of artificial gas an advantage in nearly all mechanical heating operations.

The quality of all metal work is so largely dependent upon correct heating, that the cost of the fuel is frequently not the principal thing to be considered. The quality and uniformity of the product, the saving in time and labor effected, and the increased productive capacity of operators, are more important advantages which would make systematic gas heating profitable in many industries even at higher fuel cost. This has been repeatedly demonstrated by the fuel gas system of the American Gas Furnace Co., which has gained a reputation for efficiency and economy in many important industries. It has been in operation for several years in large bicycle factories, tube works, horse shoe nail works, watch factories, dental and surgical instrument factories, metallurgical and chemical works and other industries, the quality of whose work depends upon exact and uniform heating. This company's American oil gas machine converts crude naphtha into a practically fixed gas, which consists of atomized naphtha and dry air. The operation of the machine is entirely automatic, the gas being made as fast as it is used, and delivered to burners under uniform conditions, regardless of the rate of consumption. Its operation requires no labor except what is necessary in filling the storage, and the daily lubrication of a few valves and moving parts. With naphtha at six cents a gallon, the cost of 1,000 cubic feet of such gas is 15 cents. It contains 306,000 heat units per 1,000 feet, so that the ordinary producer gas, which contains not to exceed 150,000 heat units per 1,000 feet, would have to be produced at a cost of seven cents, to compete with naphtha gas.

In comparison with the best illuminating gas it requires two volumes of naphtha gas to one of illuminating gas for the same work, but naphtha gas is more efficient since a higher heat can be obtained. Its efficiency is greatly enhanced by being delivered under a positive pressure of one pound to the square inch at the burners.

The machine takes up little room. One that delivers 10,000 feet of this gas, equal to 5,000 feet of city gas per hour, occupies a floor space not exceeding 12x14 feet, including the space around the machine required for its attendance. The gas is mixed at or near the burner in the proportion of one volume to three or four volumes of air, both under positive pressure of about one pound to the square inch. It can be fed through ordinary piping to great distances and distributed just as easily as ordinary illuminating gas. The process is approved by insurance underwriters in New York, Philadelphia, Boston, Newark, and elsewhere.

Gas has been too expensive heretofore for annealing large quantities of work, but with properly constructed furnaces naphtha gas offers advantages which would make its adoption profitable, even where no material saving could be effected in actual fuel cost. The mixture of gas and air can be easily so proportioned that annealing ovens will contain a non-oxidizing atmosphere, while the heat is so perfectly controlled and evenly distributed as to do away with all risk of over-heating or oxidation. What a uniform heat means in annealing, every wire mill, tube mill, or brass working establishment has experienced.

The literature of the American Gas Furnace Co illustrates many heating devices of original conception and design, all producing good results in practical use. These heating devices, together with the company's gas machine, form an excellent system for the generation and systematic use of fuel gas for manufacturing purposes, developed to its present perfection by intelligent study, and much experimental work. The dominating idea in the development of the system has been that gas is the only fuel that should enter a factory; that in utilizing petroleum for the generation of heat every drop must be converted into gas, and that every heat unit which it contains must be utilized, without the avoidable loss of a single heat unit.

It is stated that 1,100 different heating devices of this type have been made in the past ten years. A striking illustration of the possibilities of systematic gas heating is the fact that a heating machine for hardening and tempering small steel articles manufactured in Waterbury, Conn., turns out over 1,000 gross of these articles per hour, all perfectly and uniformly tempered, and the machine requiring but one man's attention.

Foundry Association Notes.

At a meeting of the Pittsburg Chamber of Commerce held June 2, a resolution was adopted inviting the American Foundrymen's Association to hold its convention of 1899 in Pittsburg. The invitation will be presented at Cincinnati by I. N. Frank, chairman of the committee appointed for that purpose by the Pittsburg Foundrymen's Association.

The paper presented at the June meeting of the Foundrymen's Association at Philadelphia, was by J. H. Pepper, of the *Iron Age*, on "Recent Developments in Foundry Equipment." Lantern slides were used illustrative of pneumatic appliances, molding machines, cranes, hoists, rammers, sand sifters, etc. The report of the executive committee showed great activity among steel casting manufacturers and malleable founders, and the conclusion was drawn from present conditions and prospects, that the remaining months of 1898 would be prosperous for the foundry industry. The report noted a difficulty in obtaining good molders, and continued effort was urged for the raising of the standard of efficiency in the trade.

Pittsburg foundrymen, to the number of about 20, some of the party being accompanied by their wives, went by boat to the Cincinnati convention, starting Saturday afternoon, June 4.

The regular monthly meeting of the Western Foundrymen's Association will be held Wednesday, June 15, at 7:30 P. M., at the Great Northern Hotel, Chicago. The meeting will be devoted to a report from the members who attend the American Foundrymen's Convention, at Cincinnati, and a discussion thereon. A discussion will be had of topical question No. 14, as follows: "What is your experience as to the utility and efficiency of flexible shafting for use with grinders on heavy and intricate castings?"

THE Superior Charcoal Iron Co., Grand Rapids, Mich., in a recent trade letter notes that a large number of consumers of its iron are using more charcoal pig iron than they thought, a month ago, they would require. The three furnaces of the company—Pioneer, Antrim and Elk Rapids—are producing about 2,500 tons a week. Since the opening of navigation the company has been able to make advantageous delivered prices.

THE new plant of the Enterprise Enameling Co., at Bellaire, O., is about in readiness for a full start, July 1, in turning out kitchen utensils in enameled ware. The company was started with a paid-up capital of $75,000. Theodore Rosback, chemist, will act as manager.

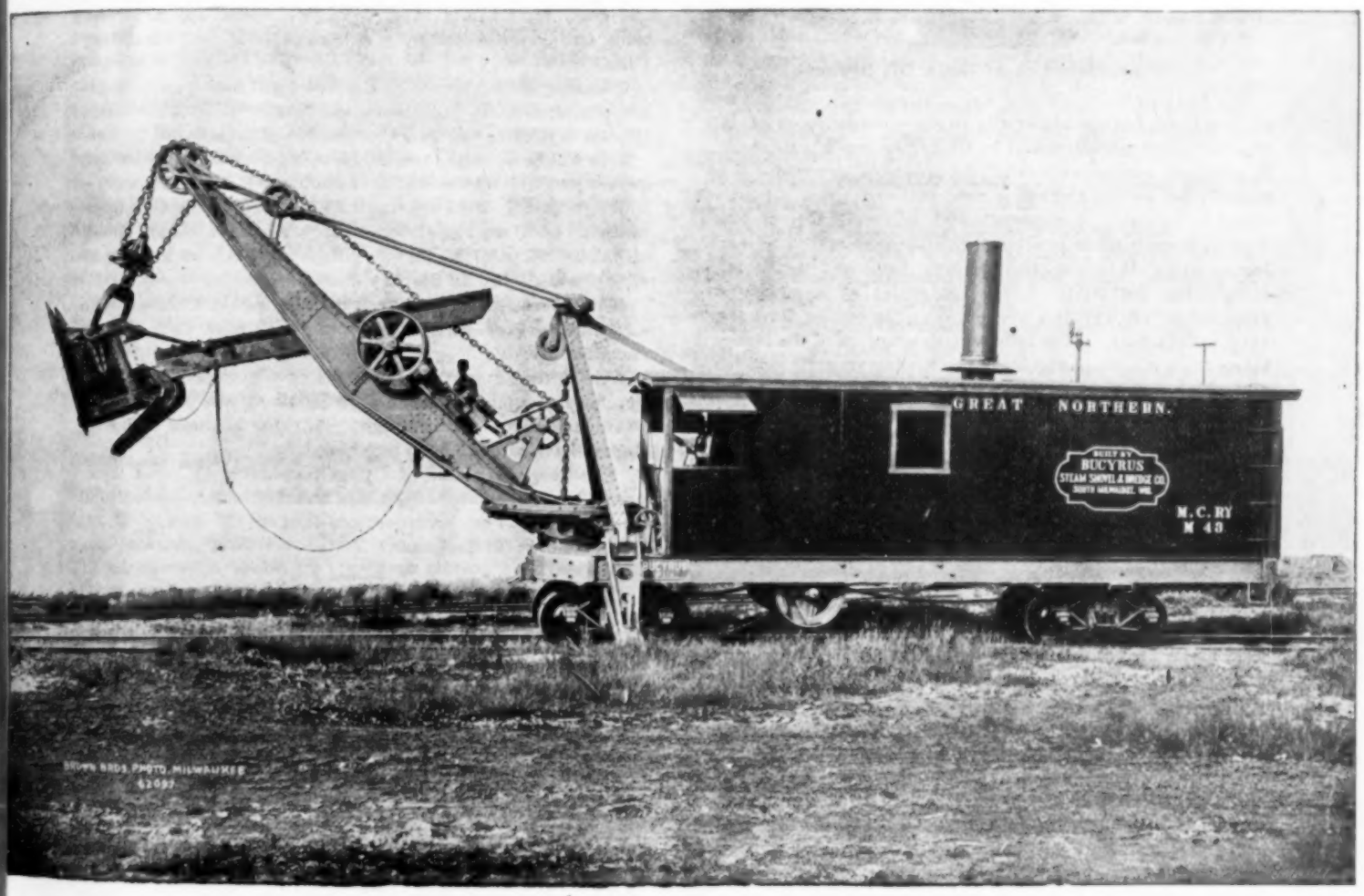
A MEETING of iron and steel sheet manufacturers will be held at Pittsburg, June 14. A committee to be appointed at this meeting will confer soon after with the committee of the Amalgamated Association on sheet mill scale.

THE Troy Laundry Machinery Co., Chicago, will move its plant to South Chicago.

THE STEAM SHOVEL IN IRON MINING.

In the severe service to which steam shovels have been subjected on the Mesabi range, both in stripping and in direct mining in the open cut, changes have been made in the design of the shovel ordinarily built for railroad and contractor's work. Heavy shovels are superseding the earlier and lighter machines, some of the latest running up to 90 tons. The shovel illustrated below was built by the Bucyrus Co., of South Milwaukee, and is one of the strongest and most powerful ever employed in excavation. Special strength is necessary, since the surface often contains heavy boulders, and the requirement is often made that excavation shall be accomplished without resort to preliminary blasting to loosen up the earth. The greater specific gravity of ore as compared with earth, moreover, is a tax on the hoisting and swinging power of the shovel.

The study has been, in designing the Bucyrus shovel, to have all parts in due proportion, with a liberal excess of strength over the requirements, the fact being recognized



THE BUCYRUS STEAM SHOVEL.

that tons of iron may be put into a shovel to little or no purpose and that it may be apparently massive and yet fail in some secondary points when put to the test. The car floor of the shovel shown is really the foundation on which it is built and forms a solid frame to which the machinery is secured. The sills are of steel beams, 15 inches deep, and more in the case of the heaviest machines. The multiplication of riveted connections is avoided. The machinery and frame are attached directly to the steel sills of the car, and after the shovel is practically completed in steel a wooden floor and house are added, but they have nothing to do with its strength. The frame strains are concentrated at the top and bottom crane supports, or gudgeons, upon which it revolves. They have large bearing surfaces and are strongly supported. A rigid support for the top center is obtained in the most direct and simple way by making it the apex of a pyramidal frame.

The hoisting engines are strongly built, have few parts and large bearing surfaces. Since shovel operators are not engineers or machinists the engines are designed so that their principal needs for steady operation are plenty of steam and an occasional oiling. The cross-heads are made without any adjustment whatever. They are of cast iron in one piece and run in solid bored guides. The bearing surfaces are made so large as to do away with the nescessity of adjustment. The length of the cross-head is equal to the stroke of the engine. The boom or crane of the shovel has been made as strong as possible, without being too heavy. An unduly heavy boom is a load upon the front end of the machine and its inertia prevents rapid swinging.

Particular attention has been paid to the thrust motion. In machines for ordinary work the power for thrusting out the dipper is derived from the main engines, or from the hoisting chain by means of a friction clutch; but for heavier service independent engines are provided on the boom. The bed plate for the two cylinders is cast in one piece, with heavy flanges and ribs to fit the boom. The independent engines give control of the dipper when working among boulders and permit of thrusting it in or out to get the proper position over the car for dumping. They increase the efficiency of the machine by leaving the whole power of the main engines available for digging.

Large sheaves are provided in the Bucyrus shovel, the practice being to make sheave diameters about 25 times the diameter of the iron of which the chain is made. An all-steel diamond truck is provided, having extra heavy arch bars and a bolster formed of two steel I-beams, with riveted plates top and bottom. The jack-arms are strongly constructed and of a distance apart from the screws to give stability. They are pin-connected, the upper member being attached to the base of the A frame and the lower member to a continuous truss across the car. In this way the A frame is made to form part of the truss.

The use of a horizontal boiler is recommended by the Bucyrus Co., as best for steady, reliable work—one built large enough to supply the steam with ease. The boiler is covered and fed by an independent steam pump as well as an injector. The study in the construction of all features of the

shovel is to make them substantial and durable, the experience being that a more liberal outlay in the first instance is distinct economy in the long run.

More recent sales of Bucyrus shovels to mining companies have been the following: Ashland Iron Mining Co., Ironwood, Mich., 1; Aurora Iron Mining Co., Ironwood, Mich., 1; Allegheny Iron Co., Oriskany, Va., 1; Biwabik Ore Co, Duluth, Minn., 2; Chapin Mining Co., Iron Mountain, Mich., 1; Cleveland Iron Mining Co., Ishpeming, Mich., 2; Crozier Iron Co., Reid Island Station, W. Va., 2; Chandler Iron Co, Duluth, Minn., 1; Canton Iron Co., Duluth, Minn., 1; Calumet & Hecla Mining Co., Calumet, Mich., 1; Minnesota Iron Co., Soudan, Minn., 3; Mahoning Ore Co., Hibbing, Minn., 2; Metropolitan Iron & Land Co., Ironwood, Mich., 2; Newport Mining Co., Ironwood, Mich., 1; Penn Iron Mining Co., Vulcan, Mich., 1; Queen Mining Co., Negaunee, Mich., 1; Tamarack Mining Co., Calumet, Mich., 1; Winthrop Iron Co., Ishpeming, Mich., 1; Cambria & Lilly Mining Co., Negaunee, Mich., 1; Pittsburg & Lake Angeline Co., Ishpeming, Mich., 1; Iron Cliffs Co, Ishpeming, Mich., 1, Biwabik Bessemer Co, Biwabik, Minn., 3; Lake Superior Consolidated Iron Mines, Duluth, Minn., 2.

Characteristics of India Oil Stones.

The Norton Emery Wheel Co., Chicago office 25 S. Canal st., has been adding materially to its storage room of late. The company now carries at its Chicago store a full stock of its products, and is prepared to fill orders of any size. It has recently put on the market a new make of India oil stones which is the result of the work and experimenting of years. The oil stone is made in all shapes and sizes and is of excellent quality. It is sent out to reliable firms and mechanics in sample lots for trial. Large quantities of samples have gone out in this way and in every case the replies have been very satisfactory. The following description of the stones is taken from a little pamphlet the company recently published and which will be sent on application: "The fine stone is fast cutting and close grained, leaving a smooth, keen edge on the hardest and finest of steel tools, giving results equal to any obtained on the regular trade lines of Arkansas stones now on the market. The medium stone, though several grades coarser in grain than the fine stone, still makes a good working edge on all ordinary tools in everyday practice, and will compare favorably with and lead all other medium stones in common use. The coarse stone, which is again several grades removed from the medium stone, is most in demand for work where speed is considered before fine finish, and if used under proper conditions, will give surprising results on the class of work for which it is intended.

"The 'fine' stones are adapted for all descriptions of high class wood and metal working tools, such as in piano and cabinet work, pattern, stair and mantel building, etc., also for knives for the finer grades of cloths like silks, satins, serges and other fabrics, and for all classes of tools requiring fine cutting edges. The 'medium' stones are adapted for carpenters' and pearl workers' tools, ordinary scraping tools, also cloth, leather, rubber, and paper cutting machine or hand knives, and will make a quick cutting edge, although not quite as smooth as the 'fine' stone. The 'coarse' stones are adapted for ordinary machine shop or wood working tools where fast cutting is required, without regard to fine finish, also for rubbing stones if used with plenty of water, oil or other lubricants."

RUSSIAN iron and steel production, for 1896, is officially reported as follows: Cast iron, 1,612,034 metric tons; wrought iron, 502,243 tons; steel, 697,736 tons. This is an aggregate increase of 157,736 tons over 1895. The eight establishments of Middle Russia produced 638,744 tons, while the 91 private and 13 government establishments in the Ural produced only 580,796 tons. In 1896 the importation of cast iron amounted to 75,217 tons, as compared with 160,508 tons in 1893.

A TRANSACTION negotiated recently by a Philadelphia firm is the sale by the Nova Scotia Steel Co. of about 70,000 tons of iron ore from Newfoundland to a German furnace company. The ore carries about 52 to 53 per cent of iron and 0.7 to 0.8 per cent of phosphorus.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

Manufacturers of steel plates will be interested in the fact that bids are being asked again on the riveted work for the Coolgardie, West Australia, water pipe line, of which not a little has been said in the past year. Bids are asked until Aug. 23, for furnishing 246 miles of 31-in. riveted steel pipe, 82 miles of from 26 to 29-in. welded steel pipe, etc., for the proposed works. Form of bid, with drawings, specifications, etc., annexed, may be obtained on payment of a fee of two guineas ($10), at the office of the agent-general for Western Australia, 15 Victoria st., Westminster, London, S. W., or at the office of Seward, Guthrie & Steele, 40 Wall st., New York.

Harding Mfg. Co., Nashville, Tenn., will buy a 25-inch engine lathe; second-hand will do.

Charles Kaestner & Co., Chicago, are in the market for an 800-lb. steam hammer, second-hand.

A good second-hand Corliss engine, about 250 h. p., left hand, will be purchased by J. Allen Smith & Co., Knoxville, Tenn.

Wheeling & Elm Grove R. R., will build new power house and put in electric machinery at Wheeling, W. Va. Write Hazlett & Brown, engineers, or Paul O. Reymann.

Bids will be opened June 20, for a high truss steel bridge, 90 feet long, 16 feet wide, at Lebanon, O. I. N. Walker, is county auditor. Bids are wanted until June 16 for the superstructure of a steel highway bridge across Licking River, at Zanesville, O. The length will be 250 feet, with roadway 18 feet wide. Jas. L. Starkey is county auditor.

The Trives Iron Co. has been incorporated at Chicago, with a capital stock of $2,500, by Hamilton Moses, C. W. Lucas, and C. S. Hardy.

W. S. Milne, manufacturer of chairs, Cleveland, Tenn., will purchase new pumps, steam pipes, shafting and pulleys and a 200-incandescent electric light plant for his new building. Boilers have already been purchased.

The Beery Mfg. Co., of Upper Sandusky, O., was incorporated with a capital of $40,000, to manufacture agricultural implements. The incorporators are F. E. Beery, F. A. Beery and W. T. Tschanan.

New Construction:—

The Centerville (Ia.) Foundry & Machine Co. has let the contract for the erection of its factory to Scott & Co., Lancaster, Mo.

H. C. Strong, of Mauston, Wiss., is making prepartions to erect a large building to be used as a machine shop, and for other purposes, 24x80 feet, two stories high.

The Bryant Electric Co., of Bridgeport, Conn., is erecting a new two story house 50 ft. square. The building has brick side walls, and the framework is of steel skeleton type. The floor of the building is supported on heavy girders and columns, which carry steel joists supporting corrugated iron arches and concrete floor. The roof has clear span trusses carrying corrugated iron covering, lined with patent anti-condensation roof lining, which prevents the condensation of moisture on the underside of the roof covering, and avoids any damage or inconvenience from moisture dropping on the delicate machinery or material on the floor below. This building was designed and the steel material furnished and erected by the Berlin Iron Bridge Co. of East Berlin, Conn.

The Moore Mfg. Co., of Cleveland, formerly of Milwaukee, has changed its company name to the Chisholm & Moore Mfg. Co., and has increased its capital stock to $150,000. The company has bought 266x331 feet on the corner of Lake and Kirtland sts., Cleveland, with switching facilities from the Pennsylvania Co. and is erecting a brick building with iron trussed slate roof, into which it expects to move about August 1. Its business in chain hoists, cranes, trolleys, steel door hangers, etc., has increased very rapidly and has far outgrown its present quarters in the shops of the HP Nail Co. The company is putting on the market an electric chain hoist for which there promises to be a large demand.

The Western Electric Co., Chicago, it is announced, will erect an eight-story building at the southwest corner of Con-

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Harrison Safety Boiler Works,
PHILADELPHIA, PA.

gress and Clinton sts., at a cost of $250,000, to replace an old structure now occupied as part of the plant at that point. Construction of another large addition to the plant is nearing completion. The old building proved inaduquate to meet the demands of the company. Samuel A. Treat drew the plans for the building, and the Falkenau Construction Co. has the contract for the construction. The building will be fireproof, having a steel frame and outer construction of brick.

The Bullock Electrical Mfg. Co., Cincinnati, will soon commence the erection of the new buildings on the property purchased by it in Norwood, O. The buildings will cost upward of $150,000, and all machines will be run by electric motors.

The directors of the A. W. Stevens Co., implement manufacturers, Marinette, Wis., have adopted plans and specifications for their new buildings, which will cost about $30,000.

A brick and stone foundry will be erected by the Filer & Stowell Co., Milwaukee, the cost to be $6,700.

Additions, Enlargements, Removals, Etc.:—

The plans for the stove works of Graff & Co., to be removed from Sharon to Monongahela, Pa., about Oct. 1, include a main building, of iron and tile, 360 feet long, by 130 feet. The warehouse is to be 75x175, three stories, and there are several smaller buildings, an office, a freight house, etc. The contract will be let soon.

The Lebanon (Pa.) Bolt & Nut Works are excavating near the 12-inch mill for an addition. The new building will be 120x50 feet.

It is reported that six additional hot mills will be built by the American Tin Plate Co., at Elwood, Ind., making it a 36-mill plant.

It is reported that the M. S. O'Brien Wagon Works, of Lafayette, Ind., contemplate the removal of their plant to Evansville, Ind.

The Chicago Hardware Co's plant at North Chicago, has been enlarged, increasing its capacity one-third.

The Detroit Copper & Brass Rolling Mills have had plans prepared for important additions to their plant. They include a new foundry 74x150 feet in size and one story, an addition to the main building, on the south side 76x130 feet in size, an addition to the carpenter shop 36x60 feet, and a wire mill 36x60 feet. All these buildings are to be of brick, the aggregate cost being $13,400.

At Bath, Me., an addition 135x65 feet to the machine shop of the Hyde Windlass Co.'s plant will be built.

The Dillon-Griswold Wire Co., of Sterling, Ill., is putting in new machinery and enlarging its plant. The galvanizing department is receiving special attention and a new furnace and kettle will be in operation soon.

Beaman & Smith, manufacturers of machine tools, Providence, R. I., will erect a new shop, of brick and steel, 128x60 feet. It will be equipped with the latest tools, and is expected to be ready in October.

Fires and Accidents:—

McPherson, Willard & Co.'s Union steam forge, at White Hill, near Bordentown, N. J., burned May 29. The machinery was considerably damaged. The damage to the building and machinery will reach $15,000; insured.

A boiler exploded in the 28-inch mill of the Homestead Steel Works, injuring four men and wrecking the boiler house.

At Colebrook Furnace No. 1, West Lebanon, Pa., operated by the Lackawanna Iron & Steel Co., an explosion occurred June 5, iron breaking through the furnace bottom into the water. A shower of molten metal and cinder was thrown over the plant, starting several fires. The plant was badly damaged and several men were injured.

The Stoughton Wagon Co.'s plant, at Stoughton, Wis., was burned May 25; reported loss $50,000; insured.

The Phelps Chilled Plow Works, at Phelps, N. Y., were burned May 27. Loss, $6,000. The plant will be rebuilt at once.

At Williamsport, Pa., the erecting shop, foundry and the

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No. 1. Capacity, 4 inches.
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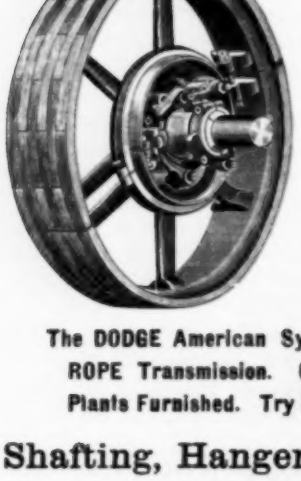

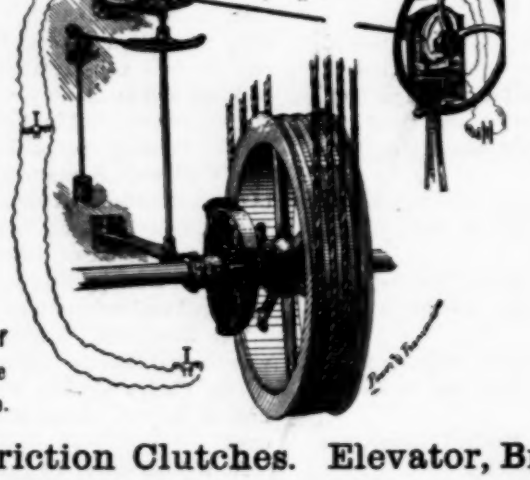

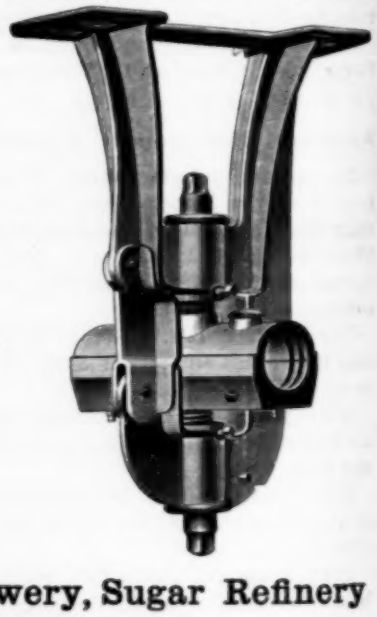

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GENERAL AGENTS FOR THE DODGE INDEPENDENCE WOOD SPLIT PULLEYS.

machine shop of the Watsontown Car Mfg. Co., burned to the ground May 30. The plant has not been in operation for eight years. Loss, $60,000; insurance, $37,000.

Fire in the foundry of A. T. Green, Aberdeen, S. D., caused a loss of $500.

General Industrial Notes:—

The Brightman Furnace Co., Cleveland, makes its monthly announcement of sales of Brightman stokers: The Steel Tired Wheel Co., Pullman, Ill., two; the American Cereal Co., Chicago, one; Chicago-Cleveland Car Roofing Co., Cleveland, one; Cocheco Mfg. Co., Dover, N. H., two; University of Illinois, Champaign, Ill., one; Eastern Hydraulic Press Brick Co., Winslow, N. J., two; Barber Ashphalt Paving Co., Omaha, Neb., two; H. C. Carroll & Sons, Philadelphia, Pa., two. The company is now shipping several large stokers, besides other special machinery, to Tunis, Algiers, Africa and Belgium, where there are already many Brightman stokers in operation. The catalogue of the company, which contains much valuable information on the generation of steam, can be had upon application.

The Playford Stoker Co., of Cleveland, calls attention to the effect of its equipment as employed at the boiler plant of the Telephone Bldg., Cleveland. The chimney at the southwest corner of the building is practically smokeless, and is the same throughout the day. Cheap slack coal is used, and with entire disregard of chimney conditions.

The American Tool Works Co., of Cincinnati, received last week large re-orders for 22-inch and 24-inch engine lathes from the U. S. Projectile Co., of Brooklyn, N. Y., and numerous inquiries for machinery are coming in from other concerns, who are about to enter upon the manufacture of projectiles and other implements of war. The demand for American machine tools in England is also steadily increasing.

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OF ALL KINDS

MANUFACTURED BY

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the London office of the American Tool Works Co. having secured a number of large orders there in the past week.

The Variety Iron Works Co., of Cleveland, was the lowest bidder on the iron work of Dam No. 10 on the Monongahela River.

In the United States Circuit Court, at Pittsburg, the Stirling Co., of Chicago, has entered a suit in equity against James Pierpont of that city, to restrain the latter from manufacturing certain boilers. It is alleged the defendant left the employ of the plaintiff company to enter into the boiler business for himself, and that the plaintiff purchased his business under an agreement that Pierpont would not engage in boiler manufacturing for 17 years. The company declares it paid him $25,000, but that he has failed to carry out his part of the agreement, and is now engaged in manufacturing boilers at New Castle. Damages and an injunction are asked.

Suit has been entered by Walter Kennedy, at Pittsburg, against the Carnegie Steel Co. to recover payment for certain patents for blast furnaces.

An ineffectual attempt was made last week to sell the Ella Furnace, at West Middlesex, Pa. The best bid received was from J. J. Spearman, for $24,000. The sale has been postponed until July 21.

The strike at the three Lebanon county (Pa.) furnaces, of the Lackawanna Iron & Steel Co., is off and work has been resumed. An increase of wages is promised soon.

Since the death of Jacob Graff, president of and principal stockholder in the Blairsville (Pa.) Rolling Mill & Tin Plate Co., there has been little likelihood of any effort being made to continue operations by the present owners, and it is likely that an attempt will be made to sell the mill. It is a two-mill plant and is probably the most antiquated tin plate mill in the United States. The hot and cold rolls are mainly of the 16 and 18-inch size formerly used, and correspondingly short. Soon after the completion of the mill some years ago financial difficulties were encountered, and the bulk of the small stockholders sold out at less than half price. Since then the mill has been kept in pretty steady operation, largely through the energy of Mr. Graff, who regretted to see the mill lie idle for even a day.—[Tin and Terne.

The Westinghouse Eectric & Mfg. Co. has closed a contract to supply the Driggs-Seabury Gun & Ammunition Co., of Derby, Conn., wtih a complete electric power plant for the handling of the big guns and castings which the company is building under war contracts for the Government.

Charlotte Furnace, at Scottdale, Pa., owned by the National Foundry & Pipe Works, Ltd., will soon be put in blast.

Coe, Powers & Co., Findlay, O., through their Eastern agents, have recently received large orders from the Government for shrapnel tubes. A rapidly increasing demand is noted for their product, which is largely used for bushings, hollow shafting and cylinders for compressing gases.

The business of the General Electric Co. abroad shows a splendid improvement this year, particularly in furnishing apparatus for equipping street railways. The company is now putting in a line at Monte Carlo. The field abroad is comparatively larger for electrical apparatus than here, as there has so far been nothing like the general adoption of electricity either on the Continent or in England. Electric lighting is being rapidly placed in large cities, but the smaller towns have not yet shown much improvement. The two branches of apparatus in which there will be the greatest progress are in street railways and lighting plants. The long distance transmission of power feature is not being taken up, except in Italy and Switzerland.

The Rogers Machine Co., 303 Canal st., Chicago, made an assignment last week. The indebtedness is between $8,000 and $9,000, with assets of about $13,000

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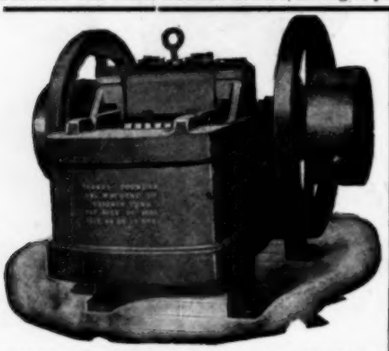

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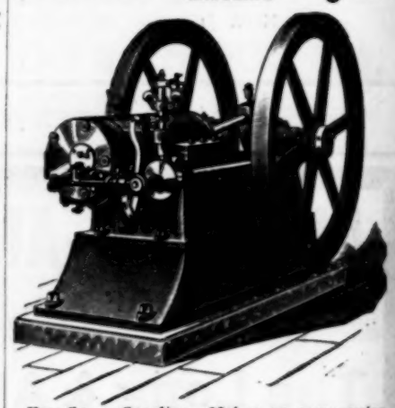

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Columbus Machine Co.,

COLUMBUS, O.

For the railroad to be built from Skaguay to Lake Bennett, Alaska, the Pullman Co. has received a contract for 35 cars and three engines, and the Illinois Steel Co. has the contract for the rails.

At Springfield, O., the Progress Stove & Furnace Co., which heretofore has bought its castings, is about to start up its own foundry.

The Bethlehem Iron Co. is pushing work in all departments engaged on Government work. In the rifling department an extra shift has been put on, making three where but one was employed a short time ago.

The Sampson ore mines, near Easton, Pa., have closed down because of the intended blowing out of one of the Thomas Iron Co.'s stacks.

The Pioneer Mining & Mfg. Co. is about to put in blast its No. 2 stack at Thomas, Ala.

The Anderson, Ind., plant of the American Steel & Wire Co., has resumed after a shut down owing to the disabling of the rod mill engine.

There is talk of early resumption of the Star and Crescent Furnace at Rusk, Tex., a new interest having come into control recently.

Puddlers at the Wheeling Steel & Iron Co.'s plant, at Benwood, W. Va., went to work last week, for the first time in five months.

F. W. WHEELER & Co., the ship builders, of West Bay City, Mich., are in financial difficulty over completion of contracts made with the Bessemer Steamship Co., of Cleveland, for constructing a steel steamer and two steel barges. A strike and advance in cost of labor have come since the contract was taken. The agent of the Bessemer company has taken possession of the Wheeler plant under the terms of the contract, and will finish the vessels. The Wheeler company has executed a chattel mortgage for $20,000 to secure various local obligations and has appointed H. P. Wickes, of Saginaw, trustee of its business. The Bessemer company will take care of paying the employes of the yard. F. W. Wheeler, in addressing the employes of the yard said that he would not be connected with the operations of the company hereafter.

$1.50 to Columbus and Return.

Via C. A. & C. Ry., Mt. Vernon-Panhandle Route, Sunday, June 12. Special train leaves Cleveland, Union Station 7:00 A. M. Parlor car. Wheels free. Get tickets at Pennsylvania offices.

Important Notice.

The C. T. & V. R. R. in connection with the C. & M. Ry. now operate two trains daily (except Sunday) between Cleveland and Canal Dover, Newcomerstown, Cambridge, Marietta, and Parkersburg. Leave Cleveland 7:15 A. M., solid through trains to Marietta without change, arriving at Marietta at 3:10 P. M. Leave Cleveland 11:00 A. M. Arrive at Marietta 7:30 P. M. For rates and further particulars call on agents or address,

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